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HEART DISEASE AS A PUBLIC HEALTH PROBLEM

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HEART DISEASE has been at the top of the mortality lists in sufficient number of states and cities for a sufficient time to convince most of us that it is a public health project that we must face.

In the dawn of the preventive concept, the most feared and most destructive diseases were smallpox, diphtheria and typhoid fever. These diseases were then rampant and killed hundred of thousands.

Because they were at the top of the list and because public attention was focused on them, men and money were made available for their study. We are now benefiting by the results of this research work which was begun when these diseases were a real menace and were at or near the top of the list.

Is it not time for us of the public health profession to take a new look at the important causes of death and grapple with some of these new problems as did our illustrious predecessors?

Is it not time for us to be spending some of our time and money on the diseases that are here and now causing the greatest economic loss?

Heart disease, causing as it does from 10 to 15 per cent of the total deaths from all causes, challenges our attention as workers in the preventive field.

Aside from the fact that it was contagious, we knew little concerning tuberculosis 25 years ago, and a preventive campaign seemed almost hopeless. With all the limitations inherent in a campaign for reduction of mortality from tuberculosis, this disease has been reduced from first place to sixth place in many states and larger cities.

Let not those scoffers who insist that we stay in the realm of contagious disease be too sure that we are not within even these narrow confines when we propose a program for the prevention of heart disease. Certain large hospital clinics show that 50 per cent of the cardiac cases give definite histories of acute rheumatic fever. While the epidemiology of acute rheumatic fever is not yet fully known, an incidence as high as this probably involves some relationship.

FACTORS IN HEART DISEASE

Subacute bacterial endocarditis is likewise associated with this group of diseases that we speak of as heart disease. Luetic aortitis is another infectious disease which has an important place in the study of heart disease. A reduction in the incidence of syphilis and better treatment of this disease will reduce the possibilities of heart damage from this cause.

If we were to consider the important killing diseases of a half century ago as being solely in the contagious field, it would be proper to take up heart disease as due to a combination of the two factors, infection and degenerative changes.

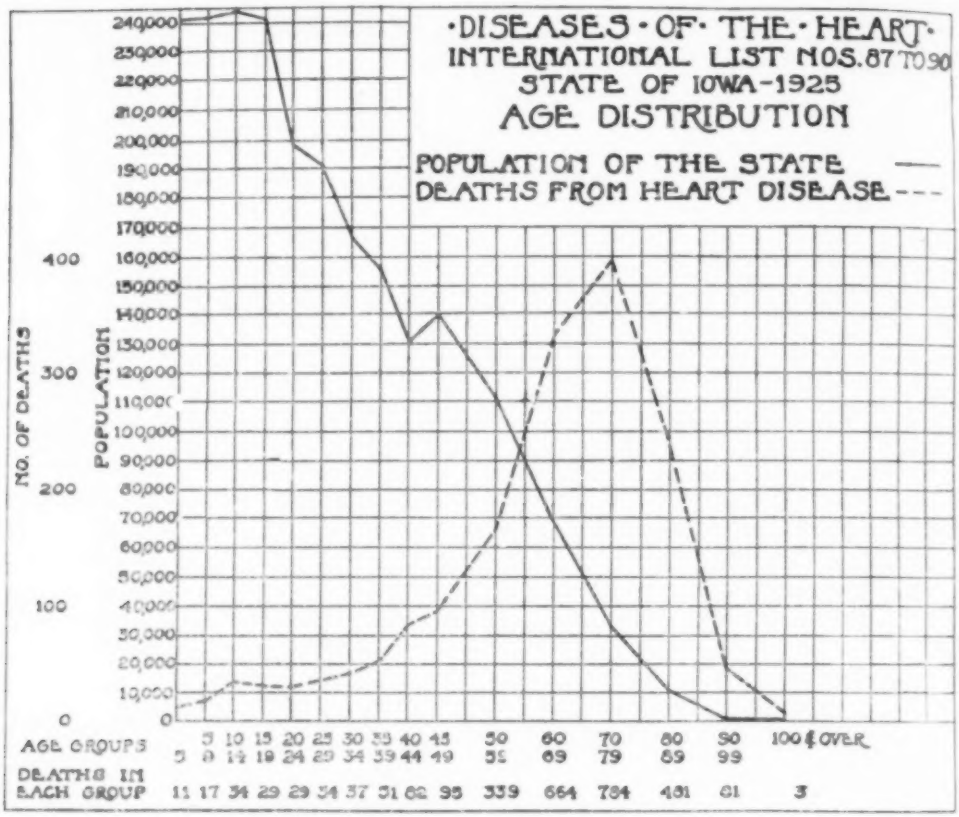

CHART I—This chart is included to show the fallacy of comparing crude rates.

It is an approximate truth, to say that the largest population groups have the smallest number of deaths from heart disease. The age groups above 50 years are the smallest of the whole range but have a larger number of deaths from heart diseases than any other.

Any tabulation therefore that did not furnish means of comparing the various age and sex groups one with the other would of necessity be incomplete and might be misleading.

There is no doubt that a factor in the heart disease problem is the degeneration of that organ due to abuse and overwork, the same as degenerative diseases of the kidney and other organs of the body. The heart has to withstand the invasion of all the infectious agents that can and do enter the blood stream. The fact that this disease is now taking top place in the causes of death brings home to us the fact that these infections take place with far greater frequency and far more killing effect than the diphtheria bacillus on the tonsil or the typhoid bacillus on Peyer's Patches.

The diseases with which we have interested ourselves in the past have caught the public eye because they were more spectacular; they were more acute; they had a more sudden onset; the course was shorter, and they came to a more dramatic

TABLE I
POPULATION
DISTRIBUTION BY AGE GROUPS—IOWA, 1925

	Male	Female	Total
Under 1	23,288	23,798	47,086
Under 5	123,558	118,992	242,550
5–9	123,592	120,287	243,879
10–14	127,463	119,087	246,550
15–19	117,983	124,264	242,247
20–24	96,148	102,286	198,434
25–29	95,457	96,666	192,123
30–34	84,226	83,178	167,404
35–39	79,735	77,402	157,137
40–44	65,136	66,475	131,611
45–49	74,850	65,795	140,645
50–59	118,175	104,994	223,169
60–69	73,539	64,552	138,091
70–79	34,148	35,398	69,546
80–89	9,193	12,640	21,833
90–99	656	505	1,161
Over 100	11	15	26
Unknown	1,852	1,669	3,521
Total	1,225,722	1,194,205	2,419,927

This data is necessary before any set of figures on deaths from heart diseases can be compared with similar figures from other states, cities or countries.

TABLE II
TOTAL DEATHS
ALL CAUSES—STATE OF IOWA, 1925

	Numbers			Per 100,000		
	Male	Female	Total	Male	Female	Combined
Under 1	1,579	1,115	2,694	6,780.7	4,685.2	5,723.5
Under 5	459	341	800	363.3	202.5	329.8
5–9	202	204	406	163.4	169.5	166.4
10–14	197	128	325	154.5	107.5	132.1
15–19	240	225	465	205.1	181.4	192.1
20–24	269	274	543	280.2	267.6	279.2
25–29	252	329	581	265.2	342.7	302.6
30–34	299	303	602	355.9	366.2	360.4
35–39	347	357	704	439.2	463.6	448.4
40–44	409	398	807	629.2	602.9	616
45–49	486	409	895	656.7	629.2	639.2
50–59	1,378	1,170	2,548	1,167.8	1,125	1,142.6
60–69	2,223	1,891	4,114	3,045.2	2,954.6	2,981.1
70–79	2,767	2,112	4,879	8,138.2	6,034.2	7,071
80–89	1,674	1,732	3,406	18,209.5	13,702.5	15,600.2
90–99	283	333	616	43,140.2	65,940.5	53,057.7
Over 100	8	12	20	72,727.2	80,000	26,923
Unknown	6	9	15	323.9	539.1	426.1
Total	13,078	11,342	24,420	1,067.5	949.9	1,009.5

As a cause of death, heart disease stands at the head of the list. In general this one cause accounts for 10 per cent of all deaths. By including a table of this sort, we can learn in what age groups and which sex, deaths from this cause is reaping an undue harvest.

TABLE III
DEATHS FROM DISEASES OF THE HEART
INTERNATIONAL LIST, 87, 88, 89, 90—STATE OF IOWA, 1925

	Numbers			Per 100,000		
	Male	Female	Total	Male	Female	Combined
Under 1	7	4	11	30.4	17.3	22.9
Under 5	6	5	11	4.9	4.2	4.6
5–9	3	14	17	2.4	11.6	7
10–14	19	15	34	14.7	12.6	13.9
15–19	12	17	29	10.1	13.6	11.9
20–24	10	19	29	10.4	18.5	14.6
25–29	16	18	34	16.8	18.7	17.6
30–34	16	21	37	18.9	25.2	22.1
35–39	21	30	51	26.3	38.6	32.4
40–44	46	36	82	70.5	54.3	61.8
45–49	51	44	95	68.2	66.8	67.6
50–59	195	144	339	164.5	137.2	150.1
60–69	377	287	664	512	445	480
70–79	447	337	784	1,302	954	1,125
80–89	256	225	481	2,795	1,780	2,200
90–99	41	40	81	6,250	7,945	6,952
Over 100	....	....	....	....	....	....
Unknown	....	3	3	....	20,000	11,510
Total	1,523	1,259	2,782	124.2	105.1	114.9

Distribution of deaths from diseases of the heart by age and sex.
This table gives in numbers, the age and sex distribution. In parallel columns are found the rates per 100,000 of population, for each age and sex group. This makes possible a comparison of the devastation caused among these groups. These rates can likewise be compared with similar rates from other states, cities or countries.

termination. They had a high degree of emotional appeal because they are highly selective for the children's age group where emotion is most easily aroused. Good, constructive work on the prevention of heart disease will not be on an emotional basis because these factors are not only inoperative but the very reverse of these factors, with all the lethargy entailed, must be faced.

The course of the disease is longer, the patient is old enough to be responsible for his own health and habits, he is usually financially able to take proper treatment and there is nothing dramatic about the whole course of heart disease, except the aged man falling off his chair or dropping in the street as he runs for a street car, or dodges an automobile. We feel sorry for the individual but in the anxiety of settling the estate, even this is forgotten.

CAUSES OF HEART DISEASE

The first phase of any project is to carry on an extensive investigation; a fact finding search. Municipal and state departments can contribute greatly in this, with the data already in their hands. We do not realize how limited this data is until we come to make such investigation

and attempt to get all the facts before us. It is only when we become sensitive to the limitations of our knowledge that we will take steps to make our knowledge more complete. Heart disease at the present time is not a reportable disease except through mortality statistics. If we are embarking on an investigation of the causation of heart disease we will of necessity have to know the etiology of heart disease. The diverse and uncertain nature of this etiology seems like an impassable barrier at the very beginning. So far as our present knowledge goes, acute rheumatic fever, tonsillitis, chorea and syphilis are among the more prominent causes.

Thyroid disease and congenital heart disease and hypertension with all its various causes, create a mechanical embarrassment on the heart which likewise has its effect.

When we speak of adding acute rheumatic fever, tonsillitis and chorea to the list of reportable diseases the practicing physician wonders where our zeal will lead us next.

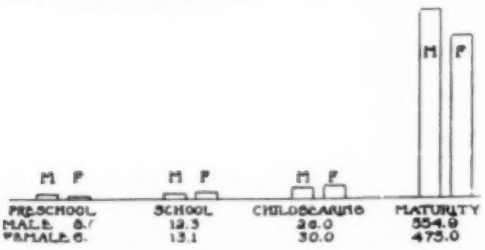

CHART II—SPECIFIC RATES FOR THE MAJOR DIVISIONS OF THE LIFE SPAN

The male rate is higher in the preschool and maturity groups while the female rates are higher during the school and child-bearing periods.

By referring to Table III it will be found that there were recorded only 3 deaths of boys aged 5 to 9 years. This small number gives a very low rate for that age group. The number is so small that the rate (2.4 per 100,000) may or may not be significant. The number and the rate of deaths from heart diseases of women in the child-bearing age groups (15 to 40 years) challenges attention. Apparently the crisis comes when the already depleted reserve is being called upon.

HOW SHOULD HEART DISEASE BE RECORDED?

Physicians and health officials must come to a working agreement, that the occurrence of these various infectious and mechanical factors that have to do with incidence of heart disease must be recorded somewhere. It may be in the home with the patient or his parents; it may be in the doctor's office; it may be in the school record or it may be with the local health department. There are pros and

CHART III—Distribution of cases by counties and cities over 10,000 population. Farmers retiring and moving to the cities after age 50 probably influences the difference in rates as much as any single factor.

The large numbers of people who retire after 50 years of age and move away probably account for the comparatively low rate in Iowa (114.9) and the high rate in the states where they go.

cons of each one of these methods of approach but there can be no question that the recording of the incidence of all the factors having to do with heart disease must be made somewhere and become a part of that individual's personal health records. The home would seem to offer a desirable place, provided that the records were made and kept and the individual stayed at his home. The doctor's office would be a good place provided that the doctor made proper records of his work and his office went on permanently after his demise. The school would be a good place because it is to this age group that the damage to the heart occurs oftenest. The health department seems a logical place inasmuch as the machinery is al-

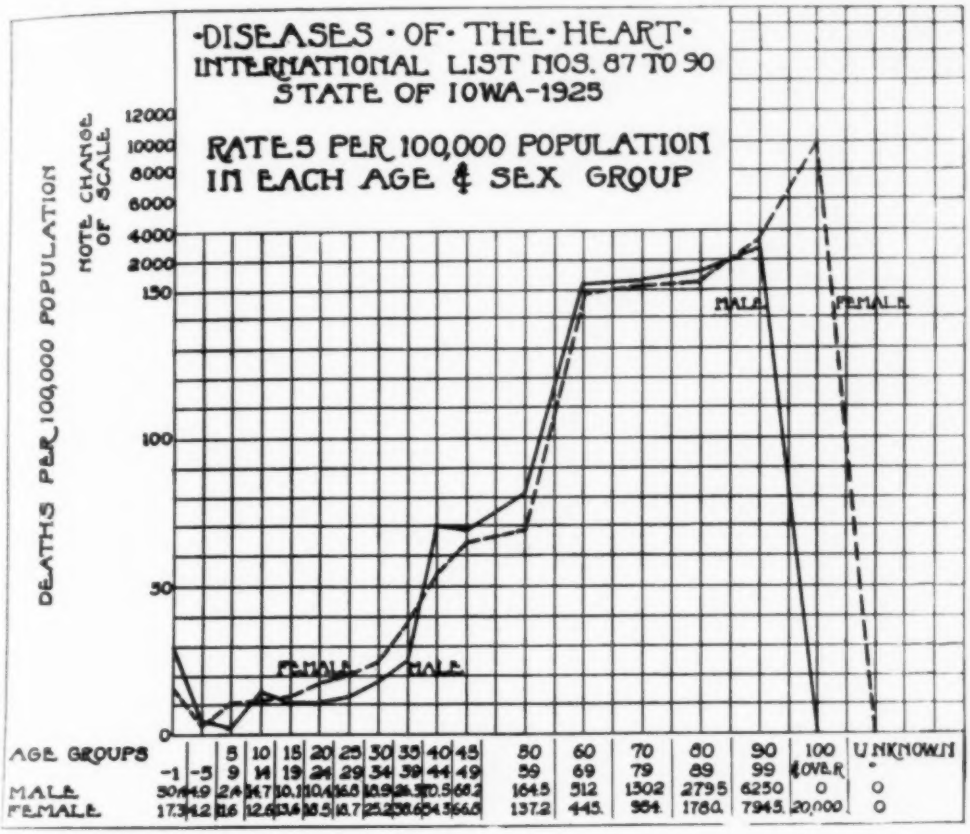

CHART IV—RATE PER 100,000 OF POPULATION IN EACH AGE GROUP FOR EACH SEX
(1) The male rate is higher for every age group from birth to age 90, except age group 5–9 years and the child bearing age group. (2) The low rate recorded in the 5–9 age group is probably due to the small number involved (3 deaths being recorded). (3) During the child bearing period (15–40 years) the rate among females is consistently higher than among males. The same characteristic is observed in the similar graph of the total causes of death. If the puerperal causes of death and the excess of females over males in heart diseases be subtracted from the total of all causes, the parallelism for the sexes during the ages 15–40 is much more marked.

ready established for such reporting and recording.

Dr. A. J. Chesley, State Health Officer of Minnesota, has for some time been making a disease census of school children. This census includes:

1. Communicable diseases that confer immunity
2. Record of immunization and vaccination
3. Attacks of rheumatism and tonsillitis

This information comes from the mother who has a more complete check on the occurrences of tonsillitis, measles, and so on, than any physician possibly could have. Dr. A. J. Chesley says:[1] "These cards have proved their worth in communicable disease work, and for this alone, their use is justified."

It is entirely possible that Dr. Chesley's method in whole or in part can be used to the great advantage of many other state and city departments of health.

After the investigational phase has been carried on to the limit of our present meager facilities, a step toward the education of the man in the street, on the importance of heart disease, must be made. We can hardly do better than to keep our eye on the program so successfully carried out in popularizing health information regarding tuberculosis. That work has been going on a sufficient length of time so that the inefficiencies can be seen

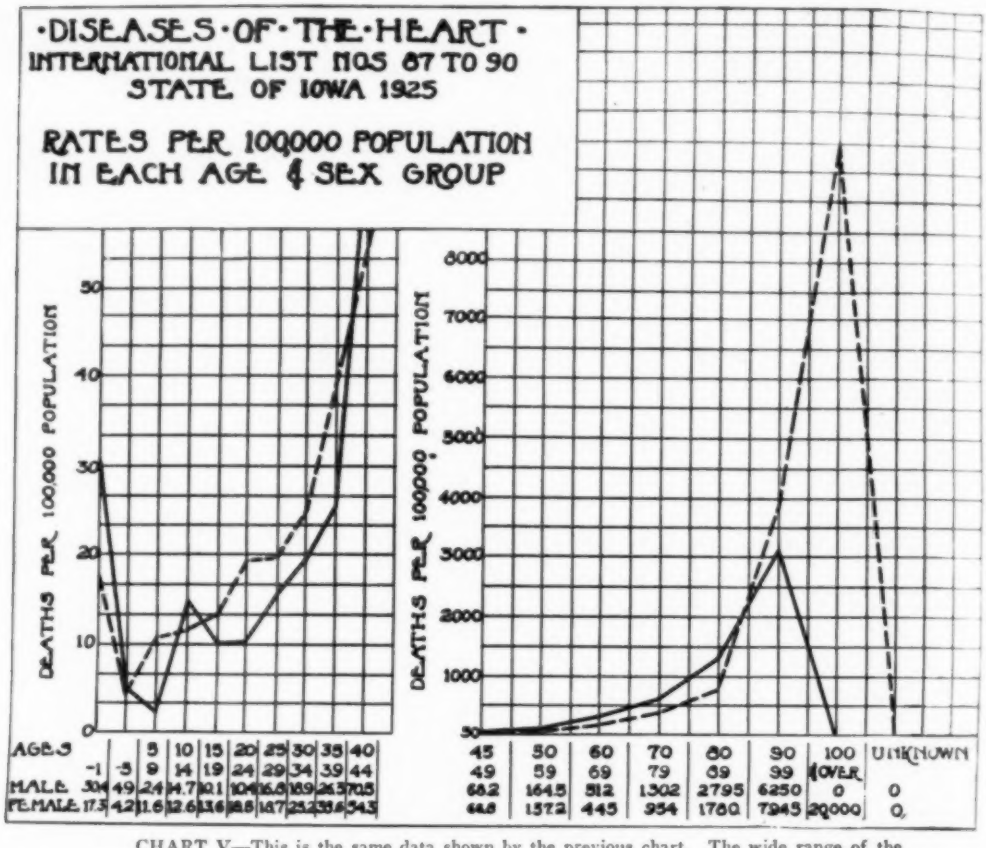

CHART V—This is the same data shown by the previous chart. The wide range of the figures necessitated some change in scale. This is merely an experiment to find the most effective way of presenting the data.

TABLE IV
SEX DISTRIBUTION OF DISEASES OF THE HEART
INTERNATIONAL LIST NOS. 87 TO 90—STATE OF IOWA, 1925

	Numbers	Percentage	Ratio	Per 100,000 Population
Male	1,523	55	120	124.2
Female	1,259	45	100	105.1
Total	2,782	100	...	114.9

In the gross, the rate is 10 per cent higher in men than in women.

TABLE V
DISEASES OF THE HEART
INTERNATIONAL LISTS NOS. 87 TO 90
STATE OF IOWA—1925

Occupations (Principal Ones Only)		Diseases Included	
Farmer	312	No. 87—Pericarditis	6
Housewife ...	810	No. 88—Endo & Myocarditis.	221
Retired	740	No. 89—Angina Pectoris ...	349
		No. 90—Other heart diseases,	2,206
			2,782

This table shows the occupation of the decedent. It is about what one would expect considering the age group involved and the principal resource of the state. It also shows the distribution of deaths among the four classification numbers included in the "diseases of the heart."

and eliminated in a new and energetic program inaugurated for the prevention of heart disease.

PROPAGANDA NECESSARY

It will not be until the general public are as well informed with regard to heart disease as they are with regard to tuberculosis that we can expect to reduce the incidence of this disease as tuberculosis has been reduced. The reduction in tuberculosis is an accomplished fact; and accomplished facts are about all the modern health officer uses for guidance.

Demonstration is one of the best means of convincing the public, the patient and the appropriating bodies of the worthwhileness of any program. Here again, the experience gained in the administration of

TABLE VI
CONTRIBUTORY CAUSES OF DISEASES OF THE HEART
INTERNATIONAL LIST NOS. 87 TO 90
STATE OF IOWA—1925

Class		
IV	Diseases of circulatory system	354
VII	Nonvenereal diseases of the G. U. system	189
II	General diseases not included in Class I.	146
V	Diseases of respiratory system	139
XIII	Old age	130
III	Disease of nervous system and organs of spinal sense	86
VI	Diseases of digestive system	68
I	Epidemic, endemic and infectious	46
XIV	External causes	42
XV	Ill-defined diseases	23
	Others	17
	Total	1,236
	Contributory cause not stated	1,546

Until there is better diagnosis of the primary cause of death, a study of the contributory causes will not yield much information.

In diseases of the heart the contributory cause may have occurred years before any embarrassment of function was noted by the patient.

clinics for tuberculosis, for venereal disease, for child welfare, will stand public health administrators in good stead in organizing a rounded out program of heart disease clinics. Municipal or state health departments can capitalize the public's eagerness for the information and the help that the volunteer agencies are anxious to give, together with the eagerness of the medical profession to find some phase of the public health program to which they can subscribe.

The following tables and charts have been prepared to show what can be done with the data now being collected. As further data is available the way will be made clearer and clearer for the entrance into this new and almost untried field of public health endeavor.

REFERENCE

1. Heart Disease Prevention by State Health Departments. *A. J. P. H.*, 16:669 (July), 1926.

QUANTITATIVE STUDIES OF BACTERIAL POLLUTION AND NATURAL PURIFICATION IN THE OHIO AND ILLINOIS RIVERS

From bacteriological observations on the Ohio and Illinois Rivers, certain relationships have been noted in the pollution resulting from known numbers of population, which, if of general occurrence, are of value in estimating the effect of adding sewage from a known population to a stream of determined volume and velocity of flow.

It is essential to know not only the concentration of bacteria but also the actual quantities of organisms per unit of time that are contributed, and for this purpose the "quantity unit" has been devised. The quantity unit is the product of a stream discharge of one cubic foot per second and concentration of 1,000 bacteria per cubic centimeter. Hence the number of quantity units of bacteria in a stream equals:

$$\frac{\text{Discharge in second feet} \times \text{Bacteria per cubic centimeter}}{1{,}000}$$

From the per capita contributions of 4 cities it was found that the numbers of bacteria varied consistently with seasonal temperature, being higher in summer than in winter. By averaging the data, the quantity units of gelatin, agar and *B. coli* counts contributed per capita could be computed. If these average per capita contributions are representative, it is then possible to compute in any stream of determined discharge the bacteria that will result from a known sewered population, by the relationship:

$$\text{Bacteria per cubic centimeter added} = \frac{\text{Population} \times \text{quantity units per capita}}{\text{Discharge in thousands of second feet}}$$

It has been further observed that such maximum bacterial content in the stream does not occur at the sewer outlet but at a point from 10 to 30 hours downstream.

From ascertained rates of bacterial decrease in the flowing stream (natural bacterial purification) it is furthermore possible to estimate, for the various seasons, the rates at which bacteria may be expected to disappear and accordingly to estimate the bacterial content at any point below the source of pollution, providing the velocity of flow is known.

Tables of the base data are included from which these relationships have been derived and also of the derived factors to be applied for computation in any case where contributing population, volume of stream discharge and velocity of flow are known.—J. K. Hoskins. *Proc. Am. Soc. Civil Eng.*, 51:1845 (Nov.), 1925, also *Pub. Health Rep.*, 41:319 (Feb. 19), 1926. Abstracted by J. K. Hoskins.

CARBON MONOXIDE POISONING IN INDUSTRY*

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IN EMBARKING upon a comprehensive study of carbon monoxide poisoning in industry, the Bureau of Industrial Hygiene is continuing a preliminary investigation begun some time ago. A survey of carbon monoxide poisoning in 31 public garages brought out the fact that 24, or 77.4 per cent, showed the presence of carbon monoxide in the air, and 17, or 54.8 per cent, showed a concentration of this gas which was in excess of the 0.1 per cent regarded by authorities as the danger limit. Of the 42 workers examined at the time, 29, or 69 per cent, showed definite evidence of carbon monoxide in their blood, and a number presented clinical symptoms of carbon monoxide poisoning. A study of the steam laundry industry made by the bureau at about the same time brought to light the fact that workers at gas-heated ironing machines had carbon monoxide in their blood in quantities ranging from 10 per cent to 23 per cent saturation.

While carbon monoxide is, on the whole, more frequently found in high concentrations in public garages (the so-called "service stations") and around blast furnaces, it may be looked for wherever gas is used as a source of heat; wherever the internal combustion engine is used as a source of power; indeed, wherever any organic substance is oxidized. It is not surprising, therefore, that there is scarcely any industrial activity in which carbon monoxide is not encountered in greater or less concentration.

Moreover, there is every reason to believe that the carbon monoxide hazard is very definitely on the increase throughout the industrial world as a result of the increasing use of gas as a fuel. Watkins points out that this is particularly true of the steel industry where gas is now being used as a fuel to replace steam in open hearth furnaces. He further states that the demand for many new grades and qualities of steel has led to the use of new and specially designed gas furnaces, thereby greatly increasing the exposure to carbon monoxide gas in that industry. C.-E. A. Winslow, Dr.P.H., in his recent book, *Fresh Air and Ventilation*, takes the position that carbon monoxide ranks first, and lead second, among the industrial poisons.

SERIOUS RESULTS OF CARBON MONOXIDE POISONING

Carbon monoxide is of special interest to the Department of Labor, not merely because it is so universally present in industry, but also because of its peculiarly insidious action on those who are exposed to it. A colorless and odorless gas, it may prove suddenly fatal even in minute concentrations, without necessarily giving any warning of its presence to those exposed. Blindness, paralysis, and even mental deterioration and insanity have in certain cases followed exposure to this gas—these conditions sometimes coming on days, and even weeks, after apparently complete recovery had taken place. In its milder forms, the only clinical manifestations may be dizziness, smarting of the eyes, drowsiness, grogginess, lack of

* Read before the Industrial Hygiene Section at the Fifty-fifth Annual Meeting of the American Public Health Association at Buffalo, N. Y., October 13, 1926.

proper coördination of the muscles, followed after a time by a most intense frontal or basal headache which may last for many hours, perhaps days, after exposure to fresh air. That any or all of these effects result in decreased efficiency on the part of the worker and greatly predispose to accidents is quite obvious. It has been shown that exposure of a pregnant woman to carbon monoxide may result in the death of the fetus in utero with subsequent miscarriage.

Because of the seriousness of the carbon monoxide hazard throughout industry the Bureau of Industrial Hygiene has approached the subject from two distinct angles: (1) A survey has been begun of the industries in the State of New York, with a view to determining the precise extent of the hazard in this state as well as the exact nature of the industrial processes responsible for this hazard. This data can then be used as a basis for the enactment of appropriate code regulations governing these industries, and for the purpose of assisting individual plant managers in solving their individual ventilating problems. (2) Physical examinations have been begun, of a representative series of workers of the state who are exposed to carbon monoxide poisoning, with a view to determining in so far as possible the physiological effects of chronic exposure to relatively small concentrations of this gas in order that some means may be developed for more adequately protecting the health and efficiency of the workers until such time as the hazard can be eliminated from their respective workrooms.

Proper resuscitation of acute cases is, of course, important, and has received considerable attention. Not so much attention, however, has been given to the everyday medical supervision and care of the great mass of workers who do not exhibit these acute symptoms, but who, nevertheless, suffer discomfort and loss of efficiency and are subjected to a series of successive minor injuries which may be cumulative in character.

In approaching the problem of carbon monoxide poisoning medically, the first industry to be investigated was the public garage or Service Station, where it has already been established that the carbon monoxide content of the air is frequently very high. This paper is offered in the nature of a preliminary report on the findings.

PHYSIOLOGY OF CARBON MONOXIDE POISONING

Physiologically the principal action of carbon monoxide is thought to be its power to displace oxygen from the hemoglobin molecule, and cause asphyxia of the tissues. Haldane, Henderson and their followers believe that all of the clinical manifestations, both primary and secondary—even coma which is prolonged for days after all carbon monoxide has been removed from the blood—can be explained on the basis of original damage done by oxygen privation at the time the individual was breathing the carbon monoxide gas.

Matthews believes that carbon monoxide combines with other oxygen receptors, as well as with hemoglobin, and thus acts directly upon the cells. Gleister believes that carbon monoxide has a peculiar specific action both on the nerve centers and directly on the nerve cells. Some very recent work of Stadie has thrown still another light on the controversy. As a result of animal experimentation, he has advanced the theory that the primary effect of carbon monoxide inhalation is its profound alteration of the normal oxygen dissociation curve rather than the mere loss of functioning hemoglobin. This alteration he believes is caused by the fact that due to the presence of the carbon monoxide in the alveolar air, the partial pressure of oxygen there is markedly reduced so that the same volume of oxygen carried to the capillaries would still not be equally available to the tissues.

Stadie has also brought out the point that due to the acid-base relation between carbon monoxide hemoglobin and oxy-

hemoglobin, the rate of elimination of carbon monoxide from the blood stream is increased by any agent which would tend to increase the acidity within the cell. This he believes to be one of the beneficial effects of carbon dioxide inhalation. The same increased elimination of carbon monoxide was obtained by him in his experiments by the administration of hydrochloric acid by mouth. The question of the entire cause for the profound and prolonged nervous manifestations following exposure to carbon monoxide cannot be considered closed at the present time.

EFFECT OF CARBON MONOXIDE ON NERVOUS SYSTEM

Injury to the nervous system, both central and peripheral, appears to be one of the most constant results of exposure to carbon monoxide, whatever the explanation of the mechanism. Of all the nervous manifestations, the most striking single symptom is the pounding headache, which is peculiarly intense and of very long duration. This headache is in itself responsible for more loss of time on the part of the workers exposed to even relatively low concentration of carbon monoxide gas than any other one or group of symptoms. Dizziness, smarting of the eyes, nausea, drowsiness and lack of proper muscular coördination were all complained of to a greater or less degree by the men examined. But these were not usually the cause for loss of time, though they undoubtedly seriously impaired efficiency and predisposed to accident. Attention was first directed, therefore, to an investigation of headache in the hope that data might be found which would suggest possible means for relieving it, until such time as the presence of carbon monoxide could be adequately eliminated from the workrooms.

TESTS FOR POISONING

In all, 22 men were examined, 20 of whom were regularly employed in a service station for a period ranging from 1½ to 14 years, and 2 were visitors. All examinations were made in the plant on regular work days. It might be mentioned that the concentration of carbon monoxide in the air on the days on which the examinations were made was not so high as is frequently found during the cold winter months. All windows were closed during the period of investigation. Several air tests were made by Dr. Salls, of the Bureau of Industrial Hygiene, using the pyrotannic acid method. The concentration of carbon monoxide varied in different parts of the large loft which housed the cars due to the fact that the engines in some cars were running and some were not. In all, 7 air tests were made and these showed a concentration of carbon monoxide ranging from 2.3 and 4 parts per ten thousand in those parts of the room not immediately adjacent to cars giving off an exhaust, to 7 and 11 parts per ten thousand 2 feet back of cars which were exhausting gasoline fumes at the time the examinations were being made. The men were doing their regular work, going from one part of the room to another. They were exposed to these conditions from 2 to 4 hours before they were examined and blood tests taken. The carbon monoxide in the blood of the 20 workers ranged from 2.3 per cent to 40 per cent saturation, and there appeared to be no correlation whatever either between the duration of exposure, the age of the individual, or the length of time which the men had been engaged in similar work. The great differences in personal reaction and susceptibility which were found are quite in accord with reports in the literature. Women are believed to be less susceptible to carbon monoxide than are men, and younger people are considered more susceptible than those who are older.

Blood samples were taken under albolene with potassium citrate as the anticoagulant, and these were examined in the laboratory *on the same day* for oxygen content, oxygen capacity, hemoglobin and carbon dioxide. Other whole blood sam-

ples were taken in addition from each individual using no anti-coagulant. These were examined for serum potassium. Red and white cell counts were made on finger pricks in the usual manner, and smears were examined for differential count and morphology of the cells. Blood pressure determinations were made in each case, and pulse and respiration taken.

The oxygen content of the blood of the men examined ranged from 2.4 volumes per cent to 10.8—the normal being approximately 19 volumes per cent. The average oxygen content in these men was found to be 5.8 volumes per cent, or little more than one-fourth the normal content of the blood, showing a very striking anoxemia. There appeared to be no correlation whatever between the precise quantity of carbon monoxide in the blood and the oxygen content. The Van Slyke method was used in making these determinations.

EFFECT UPON THE BLOOD

In making the hemoglobin determinations, the Palmer colorimetric method was used. The results were then expressed in per cent according to the more customary Newcomer scale (16.92 grams of hemoglobin per 100 c.c. of blood representing 100 per cent). The hemoglobins ranged from 40 per cent to 154 per cent, showing in many instances an apparent tendency to a compensatory increase in hemoglobin content of the blood for purposes probably of maintaining its normal oxygen-carrying content. In other cases, there was an apparent decrease in hemoglobin which was quite marked. Because the series is not considered long enough, no attempt will be made at this time to correlate the hemoglobin content of the blood with the several other factors involved. It is believed, however, that when all of the examinations have been completed, these relationships—particularly the relationship between hemoglobin per cent and oxygen content of the blood at various levels of carbon monoxide saturation—will be of considerable interest.

It might be mentioned at this point that there was no change found in either the white cell count or the differential. There appeared to be no abnormal changes in the morphology of the cells in these men. The red cell counts varied from 3,700,000 to 5,900,000, the average being 4,500,000.

The carbon dioxide content of the blood was determined by the Van Slyke method on whole bloods taken under albolene. The results were within normal limits in every case, ranging from 40 per cent to 60 per cent. Haldane is of the belief that there is no acidosis in these cases; that, indeed, there is an alkalosis induced by increased elimination of carbon dioxide from the body as a result of the increased respiration associated with air hunger.

EFFECT UPON PULSE, RESPIRATION, BLOOD PRESSURE

The pulse and respiration were found to be regularly increased, as was to be expected. The blood pressure readings were within the range of normal. However, in the cases where blood pressure determinations were made both before and after exposure, both systolic and diastolic pressures were found in *some cases* to have risen as a result of the exposure, while in others they both dropped not a little. Here, again, it is felt that the series is not long enough thus far to draw any final conclusions on this point.

CARBON MONOXIDE HEADACHE

All of the men examined were followed for several hours, and later questioned as to symptoms following their return home from work. Without exception, every one developed a typical headache of considerable severity and duration. The carbon monoxide headache is typical in that it usually begins from 2 to 3 hours after exposure to fresh air, and continues for many hours after all carbon monoxide has apparently been removed from the blood. While it was not possible to make additional determinations of the carbon monoxide saturation of the blood of these men during the last hours of the head-

ache, because of its extraordinary duration, by every calculation of the rate of carbon monoxide elimination from the body it would seem proper to assume that the headache outlasts the presence of carbon monoxide in the blood by a great many hours.

Another interesting feature which was observed in these men was the amazing pallor with which the headache was associated. This pallor was of an ashen hue and was strikingly suggestive of the ashen pallor seen among lead workers. The pallor of lead workers has been shown to have no definite relation to the hemoglobin content of the blood, but is considered to be due to a disturbance of the neuro-vascular mechanism resulting in a constriction of the capillary circulation. The pallor associated with the carbon monoxide headache in the men examined was extreme—even in the cases where there had been an initial flushing of the skin previous to its onset. The headache which is very intense—either frontal or basal, though often definitely occipital—is of a throbbing, pounding character, and is greatly increased by bending. A few of the workers experienced nausea and there was considerable nervous irritability.

These symptoms suggested very strongly that the headache might be due to increased intracranial pressure due to hyperemia of the large vessels of the brain. Indeed, its similarity in important respects to the headache associated with hypertension as well as to that associated with increased intracranial pressure due to brain tumor was rather impressive. It will be remembered that Klebs and Lewin both reported hyperemia and dilatation of the large vessels of the brain in cases of carbon monoxide poisoning. In subsequent examinations, it is the intention, therefore, to further examine with the ophthalmoscope those who have the typical headache to determine the presence or absence of pallor of the optic disc—the presence of which as is well known is regarded by neurologists as being of supreme importance in the diagnosis of increased intracranial pressure. The question immediately arises, "What would be the effect on the headache of the administration of such drugs as amyl nitrite, the action of which is to dilate the capillary circulation?" It must be borne in mind, however, that these men, in spite of the apparent capillary constriction, do not show a hypertension. A study of the action of drugs of this type with reference to the possible relief of the carbon monoxide headache would be of great interest. It has been shown that the early administration of oxygen will greatly diminish the duration of the headache.

The associated irritability with the headache suggested still another line of approach. Jacque Loeb and others have demonstrated that increased nerve irritability accompanies an increase in the potassium content of the blood serum, and it has been noted that in new-born infants who give increased electrical reaction, the potassium content of the serum is almost invariably high. In view of the apparently intimate relationship which has been found to exist between the relative concentrations of the inorganic ions potassium, sodium and calcium in the serum, and nervous manifestations, and in view of the possibility of some change in the concentration of these ions accompanying the shift in acid-base equilibrium which is thought to follow exposure to carbon monoxide gas, it was felt that some interest might attach to a study of the concentrations of these ions in the present instance. That these ions cannot permeate the normal cell wall has been shown by Peters, Eisenman and Hsien Wu.

STUDY OF INORGANIC IONS

Potassium was the first of the inorganic ions selected for the study. The analyses were made upon whole blood taken from the vein—every precaution being taken to prevent hemolysis of the serum. The Kramer and Tisdall method was used for the analyses, and analyses were made within very few hours after the bloods were collected. In spite of these special

precautions to prevent hemolysis, 16 out of the 22 bloods taken were definitely hemolyzed. Whether this increased tendency to hemolysis is due to the presence of carbon monoxide in the blood has not yet been determined, and is under investigation. Haggard and Henderson feel that exposure to abnormally low carbon dioxide tensions are likely to be associated with increased fragility of the red blood cells. In any event, the remaining 6 specimens showed no trace of hemolysis to the naked eye. They were straw-colored and quite clear, and when analyzed, 4 showed a normal potassium content and in 2 cases the potassium was high. Whether or not there was the possibility that in these 2 cases hemolysis had taken place which was so slight as to be invisible, is not certain. In the future, therefore, all sera, however clear, will be examined spectroscopically for evidences of microscopic hemolysis in order that it be established beyond any possibility of a doubt that hemolysis has not taken place. The potassium investigation will be continued further in the subsequent examination to be made.

It is hoped that the completion of the present study along the lines indicated in this preliminary report may bring to light ways and means for better supervision of the great mass of workers who are now exposed to the carbon monoxide hazard, as well as means for successfully removing this gas from their workrooms.

DISEASES OF ANIMALS COMMUNICABLE TO MAN*

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A STUDY of communicable diseases has shown that each animal species suffers from a group of infections that have certain analogies with those of man. In some cases the same infecting agent may attack several animal hosts while in others but a single species is affected. The latter is the rule, but some of the invading microörganisms and viruses have several hosts. The variation in the susceptibility of different animal species may be explained, in part at least, by the zoological gap that exists between man and the domesticated animals. Further, it is not unlikely that the difference in environment has a pronounced influence.

The study of the phenomena of animal diseases brings to attention many things of significance in dealing with human affections. Why some infecting agents are invasive for several species of animals while others are limited to one or, at most, two hosts, is an interesting question in the study of immunity. Again, the fact that certain pathogenic bacteria and viruses attack many animal species, including man, while in certain diseases, notably tuberculosis, the infecting organism varies somewhat in the different hosts, suggesting the evolution of a strain especially adapted to the species, is of greater interest to those working on the variation or mutation of pathogenic microörganisms.

Among the best known infections common to man and one or more other hosts are anthrax, glanders, rabies, and tuberculosis. The importance of these has been known for many years. As researches continue, the number of infec-

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tions in man that can be traced to lower animals and insects is increasing steadily.

SOURCE AND PREVALENCE OF ANTHRAX

Anthrax is known the world over as a dread disease of sheep, cattle, horses and, to a less extent, other species. It is transmitted to those caring for the sick animals in the field, and to industrial workers when handling the raw material, such as meat, hides, wool and bristles. The specific organism is often transmitted through the finished products, such as shaving brushes. Bellon[1] reported 205 cases of anthrax that occurred from 1909 to 1924 among industrial workers or their families in Marseilles. Of these but 25 were fatal. The low mortality was attributed to the universal use of anti-anthrax serum.

Statistics obtained by Blanton[2] show that there are annually about 130 cases of anthrax in the United States and that it is widely distributed, although it is more prevalent in some localities than in others. Jacobsohn[3] reported 61 cases in New York City from 1919 to 1923, of which 23 were caused by infected shaving and other brushes. One fatal case in which the infection took place through a shaving brush would not have been diagnosed as malignant pustule had there not been an opportunity to examine bacteriologically the lesions and the brush, in both of which *B. anthracis* were found in considerable numbers. Corona[4] has shown that the organism will penetrate through the skin of guinea pigs and cause infection as well as through injuries.

Anthrax is able to persist because of the resistance of the spores. In certain sections of this country where hemlock forests were numerous, many years ago tanneries were established and hides were imported. Some of the hides were infected and anthrax developed frequently in farm animals where the tanneries' refuse was used for fertilizer. The persistence of the infectiousness of many of the fields may be aided by the infection of small wild animals in which the specific organism may multiply. By making an early diagnosis and carefully preventing reinfection from diseased animals, the soil in many formerly infected areas is becoming innocuous. The importation of infected hair and wool has resulted in much human infection in upholstering and other establishments using such material.

CHARACTERISTICS OF GLANDERS

Glanders is a fatal disease in man. Its specific organism is unquestionably a true parasite attacking the horse, the ass and the mule. Goats, rabbits and dogs may contract it in the natural way, and it is inoculable into guinea pigs, field mice, cats, lions and tigers. Man is quite susceptible. The organism does not produce spores nor does it multiply outside the animal body except where the life conditions are favorable. In transit from one host to another it remains dormant.

A number of cases of glanders in man have been described. Robins[5] has given an analysis of 156 cases collected from the literature. The conclusions were that men are much more apt to contract the disease from other men than from horses. The mode of infection was more commonly through abrasions of the skin than through the mucous membrane. The period of incubation varied usually between 6 hours and 5 days, but it may be as long as 21 days. The lesions varied. Rashes, phlegmon and lymphatic adenitis each occurred in about 30 per cent; multiple abscesses in 80 per cent, and nasal involvement in about 40 per cent of the cases. Clinical signs referable to the lungs occurred in about 25 per cent, although focal pulmonary lesions existed in 70 per cent of the cases that came to autopsy. Localized, purulent pachymeningitis was the most common intracranial manifestation. The diagnosis required repeated animal inoculations and cultures. Scarcely 6 per cent were cured. The duration of the disease averaged 14½ months. It varied between 6 weeks and 15 years.

Gaiger,[6] who was in the Indian Civil Veterinary Department, describes his experience with the disease contracted while working on an infected Arab pony. He underwent 45 operations, of which 27 were done under general anasthesia. One of these consisted in the amputation of his left arm. The symptoms appeared first March 4, 1911, and on June 25, 1913, the last lesion was healed. This is a most illuminating account of human glanders. Dr. Gaiger states that "the treatment of glanders in man is modeled on what is found in the equine species and the consequence is, when a case occurs in man, the patient suffers considerably more than he need owing to lack of knowledge of its course and the best treatment." Dr. Gaiger gives a detailed account of his symptoms, the lesions that developed, the treatment received and operations performed. As he was trained in pathology and bacteriology, his descriptions are undoubtedly nearly, if not entirely, correct.

Hobday[13] reports being present at 2 post-mortems of men who died of glanders, and in neither case was the nature of the disease suspected by the medical attendant until just before death. One of the patients was treated for about 10 months for chronic rheumatism and the other for chronic pleurisy.

Many cases of human glanders have occurred among men who have had the care of infected horses. The replacement of the driving horse by the automobile and the reduction of draft horses in cities have cut down very greatly the amount of glanders in this country. In the United States it is no longer a source of serious loss among horses, and human cases are becoming rare.

Dr. Hobday of London, in a recent article said: "The *Soviet Red Gazette* announces that Bolshevik authorities in one of the famine districts 'for humanitarian and sanitary reasons have shot 117 children afflicted with glanders which developed after eating the flesh of horses suffering from that complaint.'"

RABIES A DREADED DISEASE

There is no other specific disease affecting man and beast that is more dreaded than rabies. Historically, it was among the first specific diseases to be recognized and described. Aristotle defines it and Virgil, Horace and Plutarch mention it. The name hydrophobia was assigned to it by Cornelius Celsus in the First Century. Galen applied numerous remedies with little or no success. Baulings, in 1591, mentions its prevalence among wolves. In Europe many serious epizootics have been reported. It was brought to America in the latter part of the Eighteenth Century, where it spread gradually throughout the United States and Canada. Thus, we find through a history of more than 20 centuries tracings of its appearance, exemplifying the essential characteristics of a specific, infectious disease.

In recent years little new knowledge has been acquired concerning its syndrome. It is characterized by a long and variable period of incubation, followed by symptoms referable to the nervous system and terminating in paralysis and death. Very few cases recover. It does not produce gross lesions by which a positive diagnosis can be made. It affects all species of animals, although canines suffer most. The disease is transmitted by inoculation through the bite of rabid animals. The infected dog is the chief means of spreading it.

PREVALENCE OF RABIES

An inquiry into the prevalence of rabies in the United States reveals the fact that it is a more formidable destroyer of life than is generally supposed. The literature shows that before Pasteur's discovery of a preventive treatment it was the cause of many deaths, especially in France. In this country prior to 1890, there seems to be little or no statistical data relative to its prevalence, excepting statements that at different times serious outbreaks occurred. Salmon made a careful inquiry soon after the establishment of the Bureau

of Animal Industry in 1884 and found that it appeared in practically every part of the country. The census of 1890 reported 143 deaths in man, scattered over 30 states. Kerr and Stimson found that in 1908, 111 people died of rabies in the United States and it appeared in animals in 534 localities.

In 1921, Dr. T. F. Sellers, Director of Laboratories, Georgia State Board of Health, found rabies to exist in 29 states, and a total of 5,558 dogs' heads were examined, of which 2,699 were positive. He learned also that there were 168 deaths in man from 1917 to 1921. Of the total, 39 died during and after the Pasteur treatment. At the meeting of the American Veterinary Medical Association in 1923, Dr. Eichhorn presented data to show that from 1920 to 1923, inclusive, there were 131 fatal cases of rabies in the United States and 20,068 people had taken the Pasteur treatment. McCoy of the U. S. Public Health Service states that in 1922 the admittedly incomplete enumeration for the year showed a little less than 10,000 persons taking treatment.

As man contracts rabies through bites of rabid dogs (rarely wild or other animals), its prevention consists in eliminating the disease from the canine species. England was free from it for 20 years when the surreptitious importation of a dog in the incubation period started the disease anew. It is important that physicians and health officers understand the early symptoms of rabies in dogs in order to protect other animals and the public against it. Glanders and rabies are primarily diseases of animals and only come to man from them. When veterinary practitioners, state and federal live stock sanitary organizations, eradicate glanders from the horse and rabies from the dog, neither of these diseases will be negligible in man.

HISTORY OF TUBERCULOSIS RESEARCH

Tuberculosis has been regarded as the most important infectious disease of cattle communicable to man. Koch in his study of strains of tubercle bacilli at the start did not distinguish between those isolated from cattle and those obtained from man. In 1896, and again in 1898, Theobald Smith called attention to the difference between the human and the bovine strains. In 1901, Koch took the position that these strains not only were different, but that the bovine bacillus was a negligible factor in the spread of human tuberculosis. This statement aroused enough criticism and opposition to become the starting point for a great deal of research on this subject. Hundreds of strains of tubercle bacilli have been isolated from cases of human tuberculosis suspected of being bovine in origin, and carefully studied and assigned to either the human or bovine type.

Park and Krumwiede[9] found about 25 per cent of a large series of selected cases of tuberculosis among young children in New York City to be of the bovine strain. Other workers have reported finding mixed infections. In human infection with the bovine type certain lesions predominate. The tuberculous infection of tonsils and cervical lymph nodes are often bovine in origin. Tuberculosis of the mesentery glands, when stationary or followed by meningitis is frequently due to the bovine type. Tuberculosis of the skin, as it occurs among those engaged in killing tuberculous animals is of bovine origin. On the other hand, pulmonary tuberculosis due to the bovine type is very rare. The differentiation between the lesions caused by human and bovine types must be made by careful bacteriological studies.

Human infection with bovine tubercle bacilli usually takes place through the consumption of infected milk. Tubercle bacilli are rarely in the milk of tuberculous cattle except when there are tubercles in the udder. The post-mortem examinations have shown that but a small percentage of cattle reacting to tuberculin in the early stages of the disease have udder tuberculosis. It is found more frequently in advanced cases, but

under the present system of dairy inspection such animals are eliminated promptly from the herd. The conclusion that should be reached on this subject seems to be that there is some infection, especially among young children, with the bovine tubercle bacilli, but such cases are not nearly so common as people have been led to believe. Fortunately, with this disease, pasteurization of milk provides a safe protection.

SPREAD OF MALTA FEVER

For many years, a disease known as Malta fever has existed on the Island of Malta and elsewhere about the Mediterranean. More recently it has been reported from several other countries, including the United Sttaes. In 1887, Bruce discovered the cause to be a microörganism, now designated *Brucella melitensis*, but he did not explain the mode of infection. This remained in doubt until 1905, when 65 goats, all apparently in a healthy condition, were shipped from Malta to America. Their milk was drunk during the passage by the captain and many of the crew, with the result that nearly all who drank it developed Malta fever. On arrival in America, *Brucella melitensis* was found in the milk of several of the goats and the blood of 32 of them gave a positive agglutination test with this organism. It was reported that about half of the goats on the Island of Malta were infected with the Mediterranean (Malta) fever and that one-tenth of them were passing the organism in their milk. As a result of measures directed against drinking goat's milk there was a decided reduction in the number of cases. Sergent emphasizes the possibilities of infection by contact, and the report of the commission on Mediterranean fever states that infection has taken place through small wounds.

UNDULANT FEVER TESTS

For a long time dairy cattle have suffered from an abortion disease that appeared to be communicable. At times large percentages of the pregnant cows in certain herds have lost their calves. In 1887, Professor Bang, of Copenhagen, discovered a bacillus (now known as *Brucella abortus*) in the fetal exudate and uterine discharges which he believed to be its cause. The etiological significance of this organism in Bang abortion disease has been confirmed by many workers both in America and Europe.

Schroeder and Cotton found that nearly 14 per cent of 271 samples of milk from 10 dairies contained *Brucella abortus*. Smith and Fabyan reported it in milk. Fabyan and Schroeder and Cotton found the organism in milk of cows several months after they had aborted. There is considerable literature on this phase of the subject. Zwick and Krage inoculated two goats subcutaneously and one intravenously with *Brucella abortus*. The organisms appeared for a period of 30 days in the milk of the one inoculated intravenously and in one of those injected subcutaneously.

In 1913 Larson and Sedgwick found the serum of a large number of women who had aborted to give a positive reaction when *Brucella abortus* was used as the antigen in the complement fixation test. They also tested the blood of 425 children for antibodies of *Brucella abortus* and found them in 72, or nearly 17 per cent. In one group of children who had been given milk from a dairy in which there had been no abortions among the cows, they did not obtain a single positive reaction.

A few cases of "Malta fever" have been reported in which the source of infection could not be traced to contact with goats, and in which no other could be established. Evans has given a review of the literature of these cases. A quotation in her paper from Kennedy is significant in this connection. "I think the possibility of a melitensis infection of cows in this country should not be lightly thrust aside. I have heard of two cases of undulant fever in people who have never been out of England, and it is pos-

sible there are others undiagnosed." Khaled states that he has seen cases of undulant fever in Egypt, where the patients had had no chance to ingest goat's milk and yet they suffered from typical Malta fever.

INFECTION WITH BRUCELLA ABORTUS

In January, 1924, Keefer reported a case of human infection with *Brucella abortus* in America. This appears to be the first case from which the organism was isolated. The clinical picture indicated Malta fever. No evidence could be found that the patient had been in contact with goats, but he had been a heavy drinker of raw cow's milk. The organism obtained from the blood was identified by Evans as *Brucella abortus*. De Korte reported a case of similar fever in a man who became infected by removing the placenta from a cow that had aborted.

In the spring of 1925 a student became ill and his case was tentatively diagnosed by his physician as typhoid fever. Later miliary tuberculosis was suspected, and a third diagnosis of malaria was suggested. Cultures were made by Carpenter from his blood and an organism indistinguishable from *Brucella abortus* was obtained in pure culture. Cultures from the blood were repeated 6 times and always with positive results. The organism was isolated from his urine 3 times. The disease ran a course of about 12 weeks when recovery followed. Clinically he presented a syndrome closely allied to Malta fever. This patient had drunk heavily of raw milk which he obtained from a dairy in which for 30 consecutive days a sample of milk was taken for examination and all were found, by guinea pig inoculation, to contain this organism. The herd was suffering from Bang abortion disease.

A second case was brought to our attention in the fall of 1925 by the same physician who attended the first. It was that of a young man suffering from reddish, edematous spots on his legs, an undulating fever and general malaise. His blood was cultured and found to contain *Brucella abortus*. He recovered in about 6 weeks.

Through the coöperation of the physicians in charge of the Second Medical Division in Bellevue Hospital, New York City, the blood of 4 other cases has been examined by Carpenter, from all of which this organism has been recovered.

Up to the present time Carpenter has produced abortion in pregnant heifers with each of the two strains of *Brucella abortus* obtained from our first two human cases. The injection of the cultures was followed by a severe reaction and abortion occurred in 20 and 6 days respectively. Bacteria, identical with the ones injected, were isolated from the fetuses, placentæ and milk from each case. The heifer inoculated with cultures from the first case was destroyed 6½ months later. The organism was still present in her milk, lymph glands and spleen. The cultures were very virulent for guinea pigs. The literature contains a number of cases from which *Brucella abortus* has been isolated.

SWINE ERYSIPELAS INFECTION

A number of European[17] observers have reported human cases of infection with the organism of swine erysipelas, *B. erysipelatos suum*. The symptoms are a slowly advancing erythema-like rash and often joint pains. Endocarditis may supervene. A case is cited in which ulcerated endocarditis was found, a lesion which occurs frequently in swine. Edel suggests that Rosenbach's erysipeloid is identical with swine erysipelas, as determined from the clinical, therapeutic and epidemiological aspects. The cause of the infection is inoculation through some injury to the skin. Practically all the cases described were in persons who came in contact with swine. According to Rupprecht this disease is quite prevalent in lower Bavaria. The period of incubation varies from 1 day to 3 weeks. Its duration is from 2 to 3 weeks, in the acute cases, and several months in the

more chronic forms. The prognosis as a rule is good, although many deaths have been reported. The treatment consists in keeping the affected part at rest and the administration of 10 c.c. intramuscularly of swine erysipelas serum.

Swine erysipelas has not been identified in the United States, although an organism closely related to *B. erysipelatos suum* has been described. In Europe it is an important disease among swine. Its communicability to man was not recognized until recent years.

PARATYPHOID BACILLUS IN CATTLE

A number of bacilli belonging to the paratyphoid group have been found in animals where they have caused more or less disease. The organism described by Gaertner from cattle and which produced fatal results in the human consumers of the meat is of special significance. In some parts of Europe from 1 to 3 per cent of the cattle slaughtered are infected. This has increased the sanitary importance of veterinary meat inspection. Recently, a serious epidemic was reported from the Essen District in Germany due to *B. paratyphosus B.* from mutton in which nearly half of the people in a city of 4,000 were affected and several died. Brüns and Hayo U. Gasters have reported that the paratyphoid bacillus affecting sheep is much more virulent for man than the one obtained from cattle.

TRANSMISSIBILITY OF TULAREMIA

In 1912 an outbreak of a communicable disease among ground squirrels was discovered in Tulare County, California. Later, Wherry and Lamb isolated the organism, *Bacterium tularense*, from an epidemic among rabbits. In 1922 Francis described this affection in man and called it "tularemia." There have been about 300 cases reported. Six cases have occurred in laboratory workers in Washington, D. C., 6 in Hamilton, Montana, and 3 in the Lister Institute, London. In these laboratories every worker experimenting with this disease is reported to have contracted it. Harris has isolated *Bacterium tularense* from infected rabbits found in the Washington Market, which came from several states.

Francis has shown that the disease is transmitted from rabbit to rabbit, in nature, by the rabbit louse, *Hemodipsus ventricosus*, and the rabbit tick, *Dermacentor andersoni* Stiles, neither of which bites man; and is transmitted from an infected rabbit to man by the blood sucking fly, *Chrysops discalis*, or by handling infected rabbits. The majority of cases in the West have been from the fly bite, and all the cases reported in the East have been from handling infected rabbits. The only animals known to be infected in nature are the ground squirrels of California, jack rabbits and cottontail rabbits. The coyotes (*Canis lestes*) are susceptible. A striking fact concerning human infection is that it does not appear to be necessary to have a wound or abrasion of the skin.

SYMPTOMS OF TULAREMIA IN MAN

The symptoms of tularemia in man have not been studied carefully in a sufficient number of cases to enable one to formulate a specific syndrome of the disease. In general, they are a continuous fever, lasting from one to several weeks, in which the temperature ranges from 99 to 104° F., or higher, and varies at different times of the day; pains in various parts of the body, and nausea. In the 17 cases reported in laboratory workers the infection gained entrance to the body without leaving evidence of a local lesion or without causing glandular enlargement of any consequence. The cases resemble typhoid fever more than any other infection. In any continuous fever in people who have handled the intestinal tract of rabbits, tularemia may be suspected.

FOOT AND MOUTH DISEASE

Among the acute eruptive diseases of animals which may affect man, foot and mouth disease, or epizootic aphtha, is the

most important. It is due to a filterable virus discovered by Loeffler in 1898. This virus attacks cattle, sheep, swine and, through the milk of infected cows, children are often afflicted. Gerlach[18] has described and illustrated the lesions in the human subject. They are in the form of vesicles and ulcers of the mucous membrane of the mouth. The disease has appeared in the United States several times, and in each epizootic one or more children are reported to have suffered. It is widespread in northern Europe where some progress is being made in its prophylactic treatment with the blood of recovered animals. Fortunately, in man it is rare and usually not serious.

COWPOX, INFECTIOUS JAUNDICE AND OTHER DISEASES

Cowpox has been known since the time of Jenner to be communicable to man. It is not, however, a serious disease. Historically it is interesting for the part it played in the evolution of vaccination against smallpox.

Infectious jaundice, or Weil's disease, has been shown to be associated with a spirochete (*Leptospira hemorrhagiae*) which is present in the kidneys of certain wild rats.

Rat-bite fever, which seems to be worldwide, has been found to be due to a spirochete different from the one causing Weil's disease. Bubonic plague has been definitely shown to be transmitted to man from rats. A number of infections have been traced to bacteria in milk, coming from cows that were suffering from various forms of mastitis.

Ringworm of horses, cattle, dogs and cats is transmitted to man and often it is a source of serious trouble. In addition to the specific infections there are several parasites of which the human subject is one of the hosts. Good examples of these are measles in beef and pork, representing cysticerci of *Taenia saginata* and *Taenia solium* in man. Trichinosis is a very serious infestation of *Triconella spiralis*, usually contracted by eating uncooked infested pork. Frequently, human fatalities occur from this cause. It is significant that the symptoms of trichinosis are similar to those of typhoid fever.

MINIMIZING THE HUMAN DANGER

Animals domesticated by man have taken an important part in the spread of infections and infestations to the human species. The better coöperation between physicians and veterinarians, especially in the field of preventive medicine, is minimizing the human danger from the diseases of animals communicable to man.

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CHICAGO'S PROGRAM FOR CORRECTION OF PASTEURIZATION DEFECTS

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THE third and fourth papers in the series on milk read at the Fifty-fifth Annual Meeting of the A.P.H.A. at Buffalo, October, 1926, appear here. Other papers to be published in the JOURNAL are:

Some Observations on the Treatment of Milk by an Electrical Method
Samuel C. Prescott

Classification and Grading of Milk
Ernest Kelly

The Effect of Different Temperatures for Pasteurization upon the Entire Flora of Milk
M. J. Prucha

Report of the Committee on Milk Supply
Discussion of Milk Papers

HEALTH OFFICIALS will agree that pasteurization has been the greatest single safeguard in protecting the public from milk-borne diseases. It has saved thousands of lives and prevented tens of thousands of cases of sickness which would have otherwise resulted from the use of infected raw milk.

However, we have recently come to a realization that commercial pasteurization, which has been so generally accepted as a perfect barrier against milk-borne disease, is in reality a barrier with many defects. The process often permits a certain amount of unpasteurized milk to go through, which contaminates to a degree the entire volume of the pasteurized product.

The report[1] on extensive investigation of commercial pasteurization on a practical scale by North and collaborating scientists, served to emphasize and confirm the belief of many public health administrators that much of the pasteurization equipment now in general use will not accomplish complete destruction of all pathogenic bacteria unless certain vital defects are corrected.

With these facts in mind, Herman N. Bundesen, M.D., Commissioner of Health of Chicago, organized, in March, 1926, a sanitary engineering program for the determination and elimination of defects in existing pasteurization equipment and in the methods of operating this equipment in plants selling milk or dairy products in the city of Chicago.

Coincident with this, the U. S. Public Health Service established its pasteurization equipment testing station in Chicago.

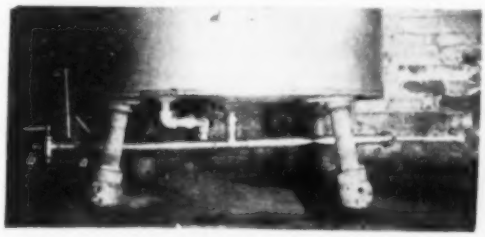

FIG. I—Showing dead end outlet pipe on round vat holder—(a-a) outlet pipe; (b) outlet valve; (c-c) test thermometers; (d) round vat holder.

Practically every type of pasteurizing equipment has been made available here for tests to determine the thermal treatment milk receives under actual plant operating conditions. Under the city's intensive program of pasteurization supervision, defects found have been rapidly corrected, giving improved equipment for final testing and approval.

A study of the mechanical and sanitary features of the various types of pasteurization plant equipment has been made by the Department of Health and considerable experimental work has been carried out to verify the conclusions reached. Conferences with representatives of equipment and instrument manufacturers were held, the defects pointed out, and with their coöperation means for their correction worked out.

The following is an outline of each defect and the method evolved for correcting it:

DEAD ENDS IN PASTEURIZER HOLDER OUTLETS

Dead ends in which the milk is not subjected to sufficient agitation or heating to keep the temperature up to that required, prevent proper pasteurization of that portion of the milk held in them. Figure I gives probably the most aggravated example of this defect in a round vat holder having an outlet at the center of the bottom and shut-off valve at the side. The outlet pipe holds 2½ pints of milk which is entirely outside the holder proper.

Thermometer readings showed that when cold milk was dumped into the

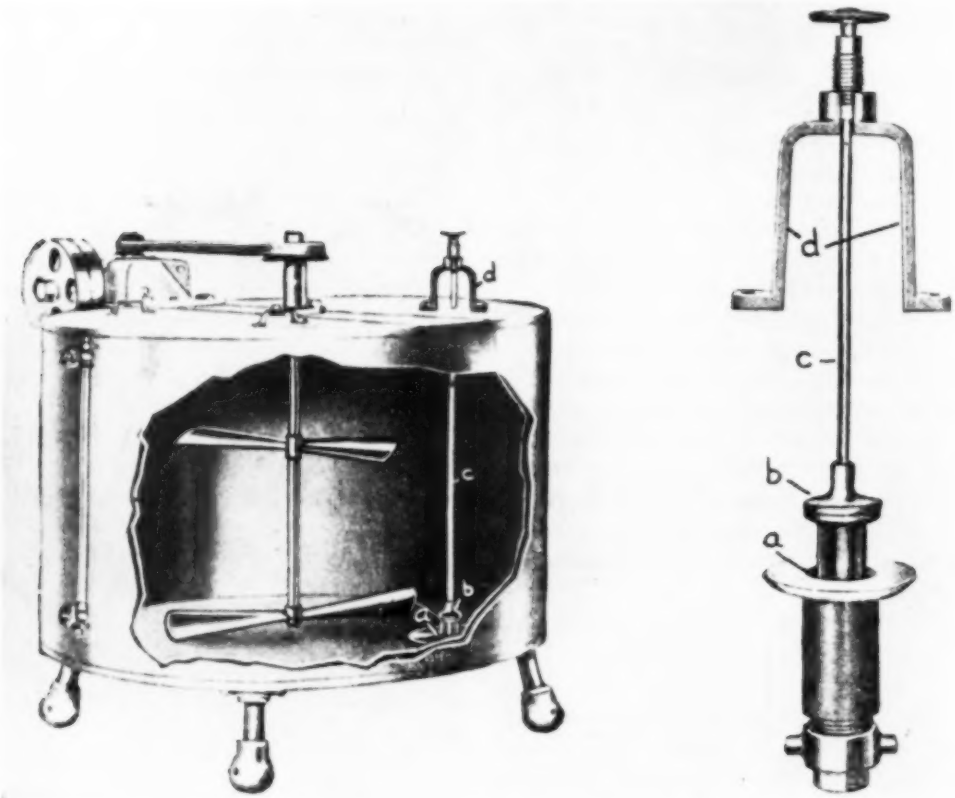

FIG. II—Showing round vat holder equipped with bottom outlet flush-type valve—(a) flush valve seat; (b) valve plug; (c) rod; (d) spindle.

holder from cans, the milk in this outlet pipe remained cold throughout the pasteurizing run. When the milk is brought up to the pasteurizing temperature in a heater and then flows into the holder, the milk in this outlet pipe has cooled to considerably below the pasteurizing temperature by the end of the holding period.

The remedy was obviously the construction and use of a flush-type valve which will hold all the milk within the zone of agitation and heating. Figure II shows the flush-type valve developed for this holder, the valve seats flush with the bottom of the vat holding all the milk subject to agitation and heating. The valve plug is on a rod which engages in the spindle on the top of the holder to give the pressure necessary to close the valve. The plug and rod can be removed for cleaning. Figure II shows this type of holder with a bottom outlet near the side of the tank. Old installations with an outlet at the center of the bottom are remodeled by moving the agitator paddle to one side, leaving the center open for the installation of the flush-type valve.

A flush-type valve developed for other holders of this round vat type is shown in Figure III. This valve can be installed on existing vats with center outlets without moving the agitator paddle and is operated from below the vat by a handle extending to the side.

On other types of vat and pocket type holders, outlet valve seats were found located from one inch to several feet from the outside wall of the holder creating dead ends in which milk cooled during the pasteurizing run. In Figure IV a coil vat holder is shown, equipped with a flush-type valve having a seat closing flush with the inside lining of the holder. Valves accomplishing this are required on all holders in Chicago. One exception is that on those existing vats which are equipped with adequate agitation and a 3-inch outlet connection in which no drop in temperature occurs, a close-coupled outlet valve providing a seat about 1 inch outside the vat is permitted.

On one type of continuous flow holder, shown in Figure V the first milk was found to cool off in the outside riser pipe prior to the completion of the 30-minute holding period. A flush-type valve at the outlet of this holder, opened by the

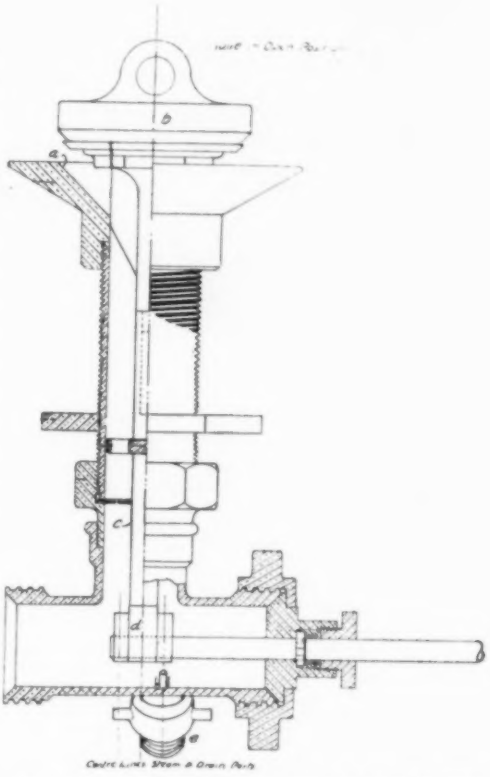

FIG. III.—Showing flush-type valve for existing round vat holders with center bottom outlet—(a) flush valve seat; (b) valve plug; (c) valve stem; (d) cam; (e) steam connection.

operator just as the holder becomes filled, corrects this by holding the first flow of milk in the holder subject to the pasteurizing temperature. The complete surrounding of this riser pipe with a jacket carrying circulating hot water will also be accepted if tests show no drop in the milk temperature.

LEAKAGE THROUGH VALVES

Numerous instances of milk valves on holders which leaked continuously were discovered and a large percentage were found to leak at intervals. A study of

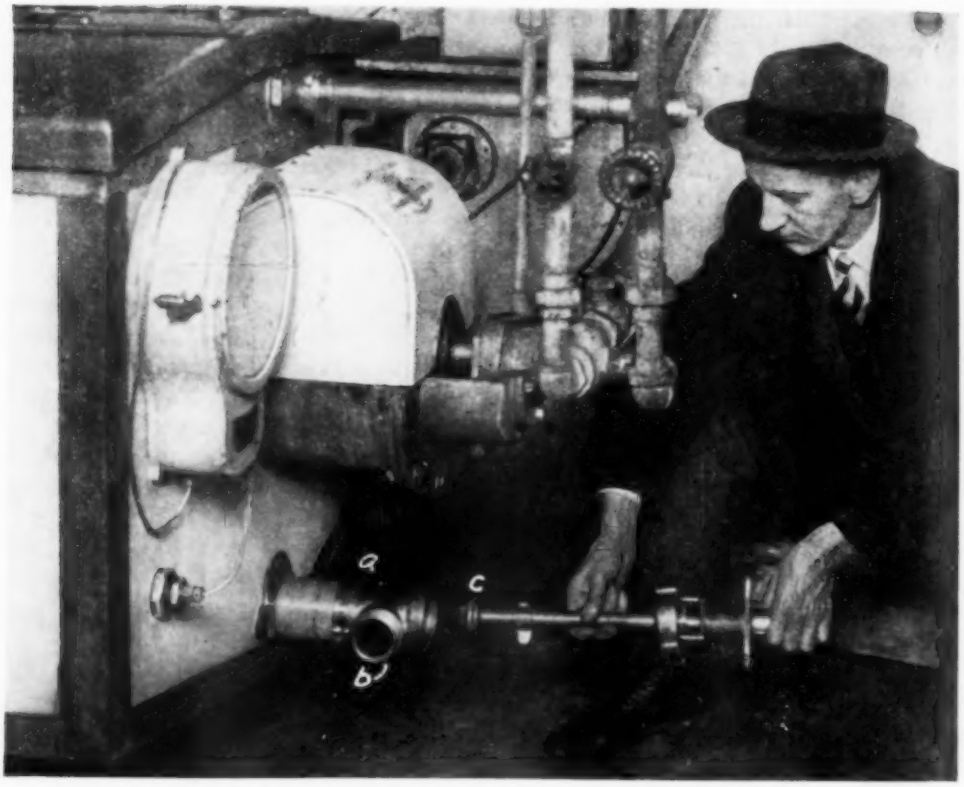

FIG. IV—Showing coil vat equipped with flush-type valve—(a) valve body; (b) outlet connection; (c) valve seat shuts off flush with inside lining of vat.

the construction and operation of the ordinary two-way and three-way valves used so extensively as inlet and outlet valves on vat holders, as well as the multiple port rotary valves used on automatic pocket-type holders, demonstrated that appreciable amounts of leakage take place through them. This may be due to any of the following causes: failure to close fully the valve, denting and scoring, ordinary wear, or warping caused by heating of the valve in sweating on a connection. When an inlet valve leaks on a header pipe feeding a battery of holders, unpasteurized milk drains into the holder during the holding and emptying period, preventing proper pasteurization of the entire batch. Similarly, when an outlet valve leaks, unpasteurized milk will enter the outlet header pipe during the filling and holding period and contaminate the pasteurized milk as it is emptied from another holder through this outlet header line.

Leakage of this character may be very small in some cases, but a serious amount has been found to be continuing unnoticed in a surprising number of instances. Such leakage is not subjected to the pasteurizing temperature for the full 30-minute holding period.

Owing to the fact that milk valves must of necessity be taken apart for cleaning, and so become dented, scored and worn with handling and usage, it was not considered practical to develop or rely upon a leak proof valve. Consequently, manufacturers were encouraged to develop a satisfactory leak protector valve to remedy this defect.

A leak protector inlet valve is shown in Figure VI. It consists of a standard two-

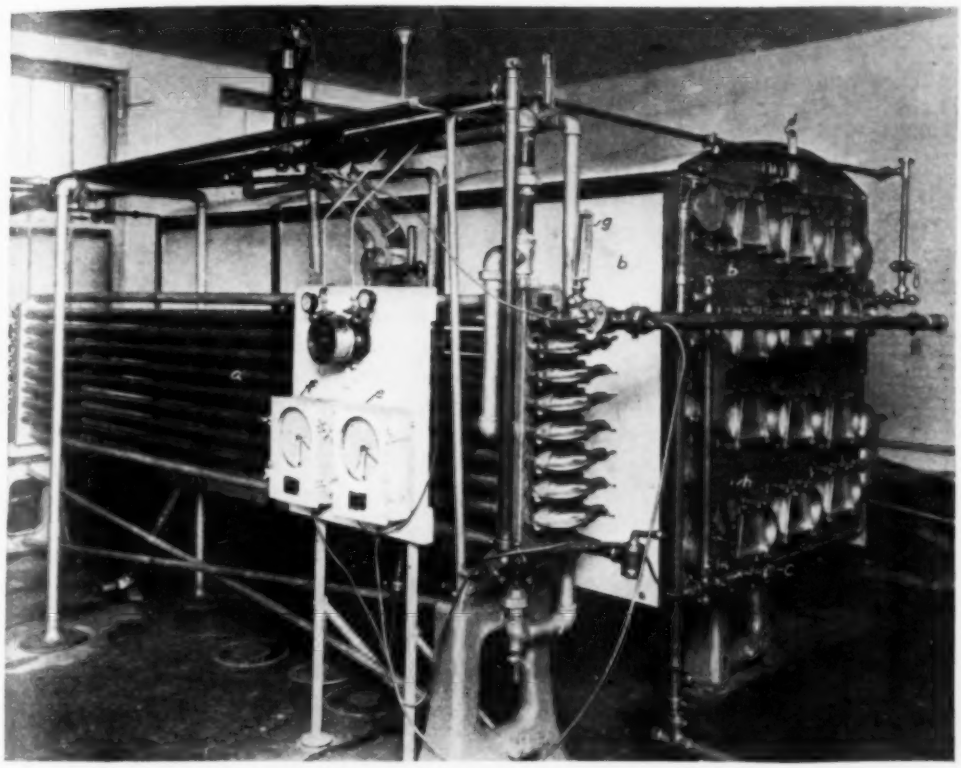

FIG. V—Showing flush-type outlet valve on continuous flow holder—(a) milk heater; (b) holder; (c) flush-type outlet valve; (d) thermometer on air chamber; (e–f) recording thermometers on holder inlet and outlet respectively; (g–h) indicating thermometers on holder inlet and outlet respectively.

way valve with a groove in the plug on each side of the discharge opening. Stops on the body of the valve, together with a pin on the plug, limit the valve movement to 90° and give maximum assurance that the valve will be operated so as to be in the exact open or closed position. Any leakage around the valve plug from the inlet to outlet openings will run into the leak grooves and drain out. To operate successfully as a leak protector, this valve should be connected directly to the holder to avoid a length of inlet piping which will drain slowly, and it should be installed with the leak grooves in a vertical position, so that any leakage will drain out readily.

Figure VII shows one of the improved flush-type leak protector outlet valves attached to a vat.

In Figure VIII, a section of the valve body is cut away showing the two seats with corresponding discs on a valve stem, the leak drain and steam valve. In the closed position of the valve, as here shown, the two discs form an empty section of pipe shutting off the milk in the holder and the outlet header pipe. In this position, the second disc opens the leak drain and steam valve. Any leakage of unpasteurized milk from the flush-type seat drains out of the leak opening. The steaming of the valve by a very minute steam flow, throughout the period when it is closed, insures sterilization of any film of leakage which does not drain out, and does not cause any baking of the milk on the valve surfaces.

The open position of the valve is shown in Figure IX. The leak drain and steam

valve close with the first turn of the valve handle just before the first disc opens and permits the milk to discharge from the vat into the outlet header pipe. This valve is seen to perform three distinct and important functions: flush-type closing, leak drainage and sterilizing action.

Figure X shows a similar valve of another make in operation on a coil vat holder.

FIG. VI—Showing leak-protector inlet valve—(a) valve body; (b) valve plug; (c–c) leak drain grooves; (d–d) stops; (e) stop pin; (f–g) connections to inlet header line and holder respectively.

The operation of these leak-protector valves has been found to remedy successfully the defect of leakage whereby pasteurized milk is contaminated by passage of unpasteurized milk through the standard two-way and three-way valves. Valves of this improved type are available for installation on both old and new holder vats of most makes.

The plain flush-type outlet valve without the leak protector, previously shown in Figures II, III and IV, is accepted by the Chicago Department of Health for installation on single vat holders under the condition that the outlet pipe be disconnected during the filling and holding period to permit leakage to drain on the floor, and that the outlet valve opening be steamed just prior to emptying the holder to sterilize any film of leakage present. For vat holders in a series as shown in Figure XI, where the outlets are connected to a common header pipe throughout all operations, leak protector inlet and outlet valves of the types previously shown in Figures VI, VII and X are required.

For automatic pocket-type holders, the elimination of the old type multiple port rotary valve and equipping of each pocket with leak-protector inlet and outlet valves is required. Figure XII shows a suitable leak-protector valve which, with the exception of the steaming device, was developed several years ago for one type of pocket holder. Valveless systems of operation for the pocket-type holders will also be accepted if tests of same prove satisfactory.

FOAM AND SPLASH

Approximately 30 per cent of the positive holders in the larger plants in Chicago had foam in amounts ranging from ½ to 12 inches deep. Upon emptying the milk from a positive holder vat or pocket, air at room temperature is drawn in. This air cools off the foam which rises to the top of the milk as the holder is filled. Consequently the foam, when cooled in this manner, is not properly pasteurized, and contaminates the main volume of the pasteurized milk when the holder is emptied.

Foam is caused by air becoming entrained in the milk. This usually takes place at the pasteurizing plant in passing the milk through a clarifier, a centrifugal type heater or a centrifugal pump which is not properly designed or adjusted. In addition, the discharge of the milk into a holder with a considerable drop and turbulence often creates foam. In one plant the foam was created to a depth of from 6 to 10 inches by a clarifier and centrifugal heater. The surface of the milk was rendered practically free in the same plant with the clarifier and centrifugal heater eliminated.

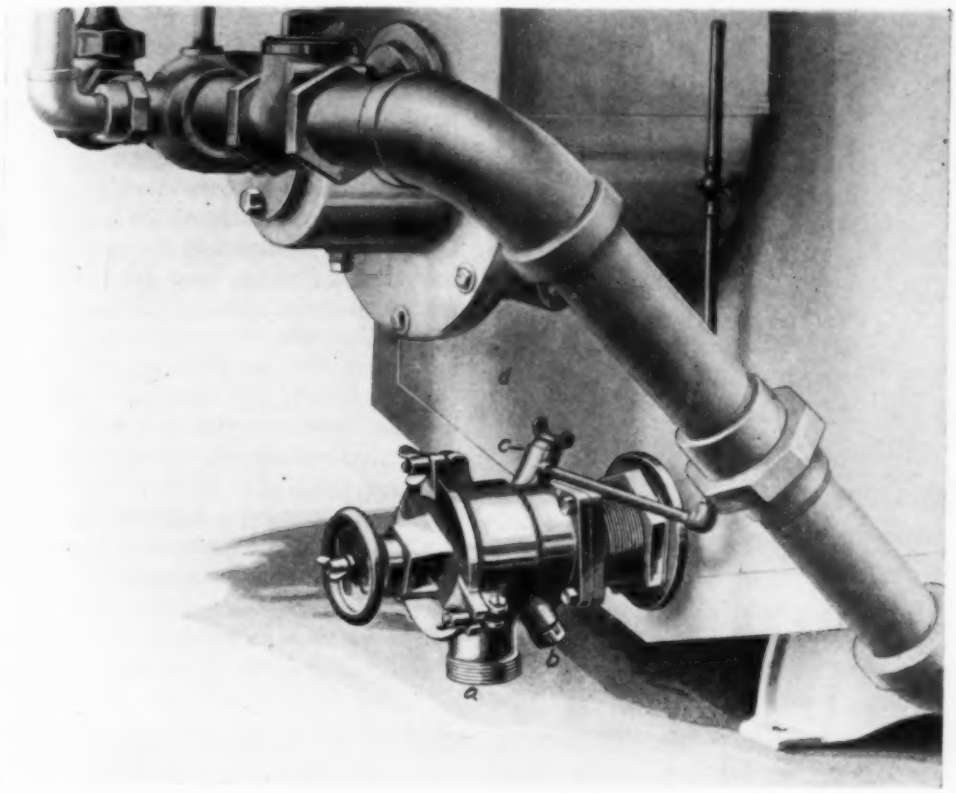

FIG. VII—Showing flush-type leak protector valve on coil vat—(a) outlet; (b) leak drain; (c) steam connection; (d) coil vat.

The old type clarifier is probably the worst offender as a foam creator. The installation of a filter or a clarifier of the new type in its place has been found to reduce the foam materially and, in some instances, to practically eliminate it. The removal or proper adjustment of an offending centrifugal type heater or pump is successful in reducing foam in other instances. Little or no foam creation has been observed in plants using other types of heaters or pumps or with certain centrifugal type pumps guaranteed against foam. The equipping of holder inlets with a device to accomplish the smooth non-turbulent discharge of the milk into

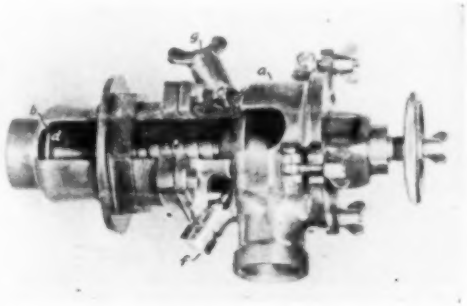

FIG. VIII—Showing flush-type leak protector valve in closed position—(a) valve body; (b-c) valve seats and (d-e) corresponding discs; (f) leak drain; (g) steam valve.

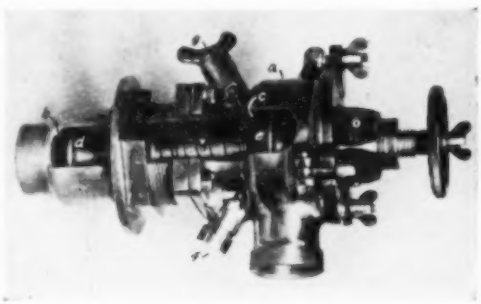

FIG. IX—Showing flush-type leak protector valve in open position; (a) valve body; (b-c) valve seats and (d-e) corresponding discs; (f) leak drain; (g) steam valve.

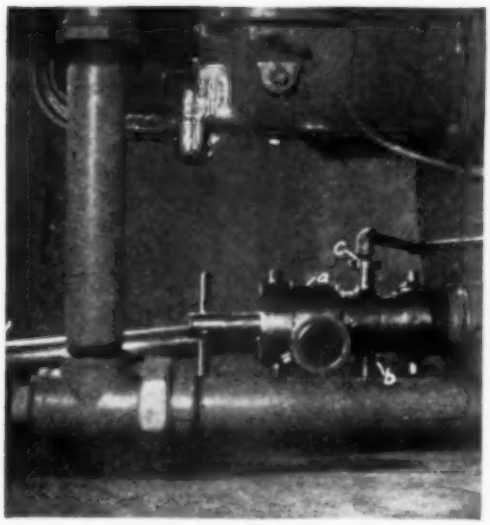

FIG. X—Showing flush-type leak protector valve on coil vat—(a) valve body; (b) leak drain; (c) steam connection; (d) outlet pipe.

the holder is successful in most instances in eliminating foam found to be created at this point.

The changes outlined are for the purpose of preventing or minimizing the creation of foam. No practical device has yet been developed to our knowledge for completely dissipating foam once formed. A probable development for insuring proper pasteurization in positive holder vats or pockets where foam cannot be entirely eliminated is the admission of heated saturated air, or steam, into the air space above the milk. With such provision, when milk carrying foam enters a holder at the pasteurizing temperature from a heater, the foam on rising will have no opportunity to cool down, owing to the fact that the air above is heated to prevent this. If steam is used, the amount necessary to maintain the air at the pasteurizing temperature is so small that the possible condensation is considered negligible.

The Chicago Department of Health requires proper pasteurization which neces-

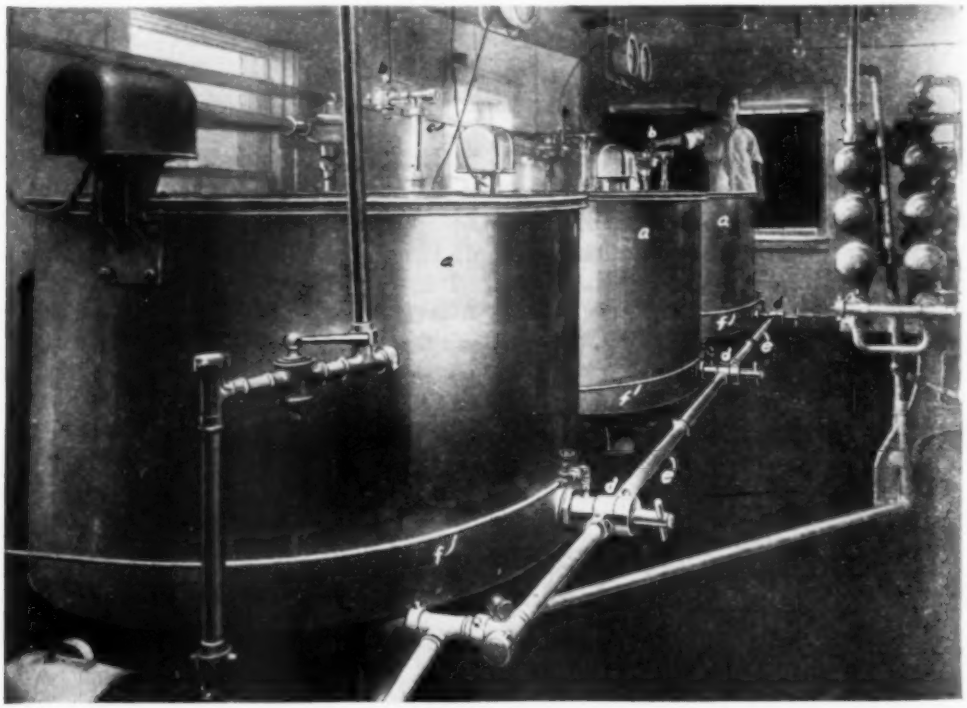

FIG. XI—Showing series of three vat holders equipped with leak-protector inlet and outlet valves. Inlet and outlet pipes remain connected—(a-a) vat holders; (b-b) leak-protector inlet valves; (c) inlet header line; (d-d) flush-type leak protector outlet valves; (e) outlet header line; (f-f) steam connections to valves.

sitates that foam either be eliminated on positive holder vats and pockets or means be provided to maintain any foam present at the pasteurizing temperature.

A defect similar to foam is splash thrown out of the main body of the milk upon the cover or sides in coil vats. This splash often will cool below the pasteurizing temperature and again drop into the milk. This has been corrected by reducing the speed of the coil, to eliminate the splash, preferably to 30 revolutions per minute or less.

DEFECTIVE CONTINUOUS FLOW UNITS

Continuous flow holders which do not subject every drop of milk to the pasteurizing temperature for the full 30-minute holding period are not permited in Chicago. The long distance tubular type is the only continuous flow holder which has been found to satisfy this requirement in commercial operation. To insure that the first milk entering this holder is properly pasteurized, the flush-type outlet valve is now required, as previously outlined and shown in Figure V. When filling the holder in starting up, the cap on one side of this valve is removed to permit leakage to drain away. It also allows steaming of the outlet valve just prior to opening it when the holder is filled. The steaming of the valve will be recorded by the outlet recording thermometer, the bulb of which is located next to the valve.

A frequent defect in operation on this holder is that the operator will fail to heat the holder to the pasteurizing temperature before starting the milk flow. The milk entering from the heater at the pasteurizing temperature will then be cooled down by the mass of colder metal in the milk pipes. The result has frequently been that the first milk would come from the holder outlet at around 125° F., and 5 to 10 minutes would elapse before the temperature of the milk coming from the holder reached the pasteurizing temperature. This meant, of course, imperfect pasteurization of a considerable amount of milk, often as much as 100 gallons. Frequently the operator would heat the holder too hot with the result that the first milk would be overheated until the tubes cooled down to the pasteurizing temperature. In this case the cream line was destroyed in this first milk. The remedy for this defect has been the placing of a special thermometer on the holder air chamber to make it possible for the operator to know the temperature inside of the holder and adjust it to the proper point before starting the milk flow.

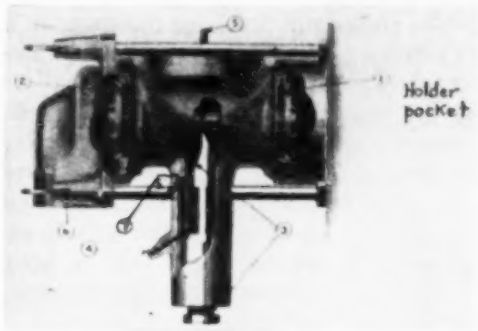

FIG. XII—Showing leak protector inlet and outlet valve for automatic pocket holders—(1) valve from holder pocket; (2) outlet header valve; (3) operating stem; (4) leakage drain; (5) removable cap; (6) connection to outlet header; (7) steam connection.

Recording thermometers are required on both the inlet and outlet of the holder to furnish a record of milk temperatures for the Department of Health. Indicating thermometers with $^1/_{16}$ inch or larger scale divisions per degree are required at the same points and the operator is instructed to rely on these rather than the recording thermometers for temperature control.

Positive pasteurization with this type of continuous flow holder is mainly dependent on the rate of pumping and the satisfactory operation of the steam controller. The use of steam pumps permits an operator to speed up the rate of pumping which cuts down the holding period below the required 30 minutes. Chicago requires a constant speed motor geared directly to the milk pump for holders of this type, timed to give at least a 30-minute holding period for every drop of milk.

Difficulty has been experienced at times in securing smooth, even operation of the steam controller on continuous flow heaters, delivering heated milk to holders of both the continuous flow and pocket type positive holder. Smooth-line recording thermometer charts are required from the holder inlet and outlet, necessitating careful attention and servicing of the heater controller to limit the variation in the heated milk temperature to less than one degree.

On large installations, duplicate controller and heater units are recommended, so arranged that the spare unit will automatically come into use in case of failure of the operating unit. Where the milk temperature drops below the pasteurizing temperature during a continuous flow run, due to failure of the controller, heater or other flow unit, the milk is required to be put through the holder again at the proper temperature to insure satisfactory pasteurization.

HUMAN ELEMENT

Full appreciation should be given to the fact that after correcting the mechanical defects in pasteurizing equipment, we still have the "human element" with which to contend. Ignorance of proper methods of operation is a particularly troublesome factor in some of the small plants and even in the large plants when untrained men relieve the regular employes. The remedy in Chicago has been thorough schooling of competent inspectors who, in turn, instruct and check the plant operators. In Chicago, 9 city milk inspectors each supervise an average of 25 pasteurizing plants, visiting each plant about once in 10 days.

The Department of Health is perfecting further plans for instruction in pasteurizing methods by means of a school for plant operators to be held this coming winter. The desirability of eventually licensing milk plant operators, requiring them to have a thorough knowledge of the various phases of clean, safe, high quality milk production is also being considered.

NOTE: The program outlined above has been developed with the assistance of Lewis Shere and with the coöperation of representatives of the U. S. Public Health Service: Leslie C. Frank, Sanitary Engineer, in charge milk investigations; F. J. Moss, Assistant Sanitary Engineer, and P. E. LeFevre, Associate Milk Specialist.

SUMMARY

In conclusion, known defects preventing proper pasteurization of milk in commercial plants have been corrected or safeguarded, as follows:

1. Dead ends at pasteurizer holder outlets were corrected by flush-type outlet valves.
2. Leakage through valves was corrected by requiring the abandonment of the old-type multiple-way valve, the disconnecting of holder inlet and outlet pipes immediately after each use, or the installation of properly designed leak-protector valves.
3. Foam was eliminated, or materially reduced, by removing or properly adjusting the unit causing it—usually the clarifier, centrifugal type heater, or pump; and by providing a special inlet pipe to accomplish the smooth non-turbulent discharge of the milk into the holder. Splash was eliminated by reducing the speed of the coil in vats.
4. Continuous flow holders not providing proper temperature or holding period have been eliminated; accepting the long distance flow-type holder when properly heated before starting; and requiring careful attention and servicing of all continuous flow units.
5. The troublesome human element was minimized by schooling competent plant inspectors who instruct the operators and make frequent inspections. A school for pasteurization plant operators is being organized.

Nothing that has been stated should be interpreted as minimizing the tremendous benefit of present-day commercial pasteurization of milk as a protection to the public health. The elimination of the defects outlined will give more complete and positive protection against milk-borne diseases.

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DEFINITIONS OF PASTEURIZATION AND THEIR ENFORCEMENT

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THERE CAN BE no question that pasteurization is the most potent single force operating to-day to prevent the transmission of milk-borne disease. In most fields of public health, however, actual practice tends to fall short of the laboratory ideal, and the conviction has recently become more and more acute that this is true of present-day commercial pasteurization. It would be very questionable service to the true cause of pasteurization were we to attempt to belittle the defects of present practice. Such an attempt would merely furnish the opponents of pasteurization with ammunition. It will be far more to the purpose to bring the defects to light and correct them. Only so will we achieve the maximum ultimate respect on the part of the consumer, and render opposition harmless.

The object of this paper is, therefore, to discuss: (1) Certain unsatisfactory aspects of the present status of milk pasteurization and (2) a suggested remedy.

THE PROBLEM

The principal difficulties in the enforcement of present-day definitions of pasteurization are:

1. *That some of them, if actually enforced as intended, do not insure uniformly effective pasteurization;*

2. *That some of them, though theoretically effective, cannot be effectively enforced without more information than is at present available to local health officers, and*

3. *That some of them, if strictly enforced as intended, will partly or completely destroy the creaming ability of the milk and consequently produce a sales resistance to pasteurized milk which it would be highly desirable to avoid if consistent with safety.*

The vast majority of definitions of pasteurization in use to-day in this country specify a temperature of either 142° F. or 145° F., and a holding time of 30 minutes. In order to simplify discussion, these limits will be freely used as illustrative examples.

The first difficulty, namely, that certain types of ordinance do not insure effective pasteurization, concerns itself with a type of definition of which the following is an example:

"Pasteurized milk is milk which has been heated to at least 142° F. (or 145° F.) and held thereat for at least 30 minutes."

Most of these definitions are enforced in a way that infers that the necessary commercial practice margin of safety will have been provided in all apparatus on the market if the recording thermometer of the apparatus indicates at least 142° F. (or 145° F.) and 30 minutes. In other words, it is assumed in most of the definitions of this type as actually enforced, that none of the many types of pasteurization machinery now in use will permit any milk to pass through at less than the rather generally accepted lethal limit of 140° F. or to be held less than 30 minutes if the recording thermometer indicates the definition temperature and time.

Unfortunately, this cannot be assumed with safety. Experiments already con-

ducted by the U. S. Public Health Service in the course of its pasteurization research work, recently inaugurated at Chicago, show that some apparatus in wide usage will permit part of the milk to pass through far below the minimum lethal temperature even if the recording thermometer indicates 145° F. and 30 minutes. In most cases this is the result of "cold pockets," foam, valve leakage, and unsatisfactory temperature and time indicating and controlling devices.

EFFECTIVE VERSUS ENFORCEABLE DEFINITIONS

The second difficulty, namely, that some definitions, though theoretically effective, are not actually enforceable with the information at present available, has to do with several different types of definition. The following is one example: "Pasteurized milk is milk which has been heated to at least 142° F. (or 145° F.) and held thereat for at least 30 minutes *in pasteurization apparatus approved by the health officer.*"

This type of definition, too, as usually enforced, assumes that the commercial practice factor of safety will have been provided when the recording thermometer indicates the definition temperature and time, but attempts to remedy the difficulty above discussed by limiting the apparatus used to such as will pasteurize effectively within the margin of safety provided by the definition. This is indicated by the wording "in apparatus approved by the health officer." This solution, however, assumes that the local health officer is in possession of all the necessary information which will enable him to bar from use all apparatus which will not satisfactorily carry out the definition requirements. Unfortunately, the local health officer does not possess this complete information. There is no published material available at the present time which will acquaint the local health officer with the design defects and the required margins of safety of all of the many designs of apparatus on the market. In order to be able to enforce this type of definition intelligently and effectively, therefore, the local health officer would need to employ a sanitary engineer or similarly trained assistant, to determine these facts for him for every type of apparatus in use in his community.

Several states and cities have recently attempted to formulate design and operation specifications for pasteurization machinery. Much good has been accomplished and many improvements have already been made by the manufacturers as a result of the enforcement of these specifications, but it is believed safe to say that practically every official connected with such work agrees that the fundamental data upon which such specifications should be based are not yet fully available for many types of apparatus. A few machines have been studied and the results secured are valuable. The machines studied, however, are far too few in number and are indeed not even named in the publications, for obvious reasons.

It is clear, then, that the local health officer is not in a position to enforce this type of definition correctly.

COMMERCIAL MARGIN PRACTICE OF SAFETY

Another type of definition which has the same shortcoming is illustrated by the following example: "Pasteurized milk is milk *every particle of which* has been heated to at least 142° F. (or 145° F.) and held thereat for at least 30 minutes in pasteurization apparatus approved by the health officer."

This type of definition presupposes an entirely different method of enforcement. In this type the commercial practice margin of safety is evidently intended to be applied above the definition limits. The phrase "every particle of which" indicates clearly that the intent of the definition is that the apparatus shall be so operated that every particle of milk is to be treated as defined and that the commercial practice margin of safety required to bring this about must be added to the definition limits in enforcing it. In other

words, if the definition requires that every particle of milk be heated to at least 145° F. the recording thermometer of any given machine must show an excess temperature above this point equal to the safety margin required by this machine.

In this type of definition we have therefore to deal in reality with 2 superimposed safety margins: One a blanket margin lying between the generally accepted lethal limit of 140° F. and the definition temperature of 142° or 145° F.; and the other a secondary margin evidently intended by the wording to be applied above the definition limit.

The purpose of the first or primary margin is somewhat vague, but possibly reflects a feeling of conservatism as to the usually accepted lethal limit of 140° F. as found in the laboratory. This is, therefore, a very conservative type of definition and would in the opinion of most authorities be effective if it could be enforced.

The enforcement of this type of definition is, however, subject to the same difficulty as is the enforcement of the one previously discussed. The information at present available to the local health officer is not sufficient to enable him to know what margin of safety he should require for the various types of apparatus in order that he may satisfy himself that "every particle of milk" is actually exposed to the definition limits, and furthermore does not enable him to recognize design defects which no margin of safety can be expected to offset.

IMPLIED DANGERS

The third difficulty, namely that some definitions of pasteurization, if strictly enforced as intended, will partly or completely destroy the creaming ability of the milk, applies to any definition which requires that any considerable portion of the milk be exposed to more than 145° F. for the usual holding period of 30 minutes. This fact has been satisfactorily demonstrated in repeated experiments.

Reduction of creaming ability is not encountered in the enforcement of definitions which are intended to require a recording thermometer temperature of at least 142° F. This is quite generally agreed upon. Some authorities believe, however, that reduction of creaming ability will be encountered whenever the required thermometer temperature approaches 145° F. because under a literal enforcement of this requirement the apparatus must be operated at somewhat above 145° F. in order that the recording thermometer will never dip below 145° F. as a result of unavoidable operation fluctuations. The testimony on this point is very conflicting, however, and many health officers are not convinced that a recording thermometer temperature of 145° F. will reduce creaming ability, if certain other plant processes are properly carried out.

Let us turn now to the other type of pasteurization definition, namely, the type in which the tempertaure mentioned does not apply to the recording thermometer temperature, but instead to the temperature to which "every particle of milk" shall be exposed.

Such of these definitions as require every particle to be exposed to at least 142° F. will not cause reduction in creaming ability unless the apparatus used requires a commercial practice factor of safety of more than 3° F. Apparatus which requires a higher margin will be apt to cause trouble.

Definitions of pasteurization which require "every particle of milk" to be exposed to at least 145° F. will be practically certain to cause creaming difficulties if literally enforced, because here the commercial practice factor of safety will lift the actual temperature to which much of the milk is exposed considerably above 145° F.

AVOID REDUCTION OF CREAMING ABILITY

Before leaving this subject it should be reëmphasized that, if consistent with safety, reduction of creaming ability

should be avoided as it will inevitably prejudice consumers against pasteurized milk. Not many consumers feel financially able to purchase cream separately, and the custom of using top milk for coffee and cereal is almost universal. It would be a superhuman task to change this custom suddenly and by force.

The thought has been advanced that in cities in which practically all of the milk is pasteurized an edict to pasteurize milk in such a manner as to destroy entirely the creaming ability would not meet with serious reaction because no raw milk would be available which the consumer could purchase. It is very doubtful, in the first place, that there would not be serious public opposition to such a step even in a universal pasteurization city. It must be remembered, in the second place, that the great majority of our cities still emphatically insist upon permitting the sale of raw milk. In these many latter communities we would be practically certain to have a reversion to the use of raw milk if we were to remove the visible cream from pasteurized milk.

It is believed, therefore, that if a definition of pasteurization can be evolved which can be rigidly enforced, which will be effective, and which will still preserve the creaming ability of milk, it will be highly desirable.

SUMMARIZING THE PROBLEM

In restating the problem it is clear:

1. *That present-day definitions of pasteurization which refer by intent to recording thermometer limits, and which do not specify approved apparatus, cannot be depended upon to provide uniformly effective pasteurization, whereas those which do specify approved apparatus cannot be entirely fairly enforced because of the lack of an adequate basis for approval.*

2. *That present-day definitions of pasteurization which do not refer by intent to recording thermometer limits, but which require "every particle of milk" to be exposed to the definition limits, obviously imply a knowledge on the part of the local health officer as to the design and operation conditions which must be satisfied before any type of apparatus will carry out the definition. This information is not at present completely available to health officers.*

3. *That some present-day definitions of pasteurization would, if strictly enforced, partly or completely destroy the creaming ability of milk and consequently interfere with pasteurized milk sales.*

A SUGGESTED REMEDY

This statement of the problem points the way fairly obviously to at least part of the remedy. Certainly, it is desirable that some competent and responsible agency should furnish us as early as possible with the results of exhaustive tests on various makes of apparatus. Certain of the state organizations may decide to undertake this work for the benefit of their citizens, or they may adopt such valid determinations as are or may be made by other agencies. These tests should determine for each type of apparatus:

1. *What design corrections should be made, if any, before its use should be authorized at all,*

2. *What margin of safety must be applied in its operation before it can be expected to apply any given pasteurization limits to every particle of milk passing through it, and*

3. *How it must be operated in order that the recommended margin of safety may be adequate.*

The agency doing the testing could well be advised and supported by a committee of experts representing health officers, the apparatus industry, the dairy industry and the federal health and dairy agencies. The United States Public Health Service has for some time anticipated the necessity of such testing work and has recently inaugurated investigations intended to define the problem and develop the technic of testing. Once such information is available for all makes of apparatus, and

continuously augmented for newly appearing types of apparatus, the solution of our problem will have become relatively simple provided only that some point or points upon the minimum lethal curve can be generally agreed upon.

This latter must, of course, be the business of bacteriologists. But until an authoritative pronouncement is issued by them to the contrary it is believed that it will be a sensible policy for health authorities to accept the rule that 140° F. will be lethal for milk-borne pathogens if actually applied to every particle of milk for 30 minutes.

If this be tentatively assumed, we have then merely to decide: (a) whether we wish to incorporate in our definition an arbitrary blanket margin of safety covering all apparatus, and bar from use any apparatus requiring more than that margin; or (b) whether we wish the definition to state in absolute terms the time and temperature which shall actually be applied to every particle of milk, and then to require that the recording thermometer of any given machine must show the legally required temperature and time plus the safety margin officially recommended for that machine.

REWORDING DEFINITIONS OF FIRST AND SECOND TYPES

If the first type of definition be selected it might read as follows: "Pasteurized milk is milk which has been heated to at least (—°) F. and held thereat for at least (—) minutes as indicated by its recording device, provided that no apparatus shall be used which has not been approved by the (accepted agency making the official tests) for use under this definition, and provided that all apparatus shall be operated in accordance with the directions recommended by the (accepted agency making the official tests)."

If the second type of definition be selected it might be worded "Pasteurized milk is milk every particle of which has been heated to 140° F. and held thereat for 30 minutes in apparatus approved by the health officer, provided that the recording device shall indicate a temperature and time in excess of 140° F. and 30 minutes, equal to the safety margin recommended by the (accepted agency making the official tests) for the apparatus in question, and provided the apparatus is operated in accordance with the directions recommended by the (accepted agency making the official tests)."

It is obvious that neither of the suggested definitions can be used immediately. They are without value until the complete information necessary to their enforcement is available.

Therefore, the question will immediately arise: How can the health officer best protect the milk consumer in the meantime? It is believed that his most effective work will be to see that the defects in the design of pasteurization machinery are corrected.

STUDIES OF PASTEURIZATION MACHINERY

The pasteurization machinery studies being conducted by the Public Health Service in Chicago show quite clearly that in pursuing the sharp controversy as to whether the definition temperature should be 142° F. or 145° F. we have neglected the equally serious problem of machinery defects which neither of the two temperatures will offset.

Neither 142° F. nor 145° F., as indicated by the indicating or recording thermometers for the main body of the milk, will offset a temperature drop frequently as high as 6 or 7 degrees and occasionally as high as 50° F. in the milk in "cold pockets" which are beyond the influence of the heating and agitation devices. These "cold pockets" usually consist of a pipe section between the holder proper and the effluent valve. The milk in these "cold pockets" is not properly heated during the heating period or drops in temperature during the holding period. The remedy for this defect is, of course, either to bring the seat of the effluent valve flush with the inside of the holder (flush type valve) or so nearly flush as

to bring the milk within the effluent fitting within the influence of the milk agitation device (if there is one). This will cause a constant exchange of milk between the holder proper and the inside of the fitting.

Where the holder is not provided with an agitation device, as in the case of certain pocket type designs, the flush type valve will probably be imperative. The "cold pocket" defect exists also in the riser pipe at the effluent end of certain continuous flow apparatus. The remedy here consists also in providing a flush type valve. Furthermore, neither of the two controversial temperatures will be adequate to solve the problem of "cold foam." A large percentage of the designs of milk handling equipment in use to-day results in the formation of a blanket or of islands of foam on the surface of the milk in the vat or pocket type holders.

The temperature of the air above the milk is frequently far below the temperature of pasteurization and our studies show that the temperature of the foam can be well below 130° F. when the main body of the milk is at 145° F.

CORRECTION OF FOAM AND MILK MIXTURE

It is, of course, obvious that the mixture of foam and milk which leaves the vat at the end of the pasteurization process is not safely pasteurized. Any infection present in the foam before pasteurization may be present in the foam after pasteurization and will partly destroy the value of the pasteurization process. The remedy is, of course, either to eliminate the foam entirely or to keep the foam at the pasteurization temperature.

Steps are now being taken by the manufacturers of milk plant equipment to eliminate or reduce foam by correcting the designs of the principal offenders, namely, milk pumps, milk clarifiers, flush heaters, and turbulence producing inlet devices to pasteurization vats or pockets. Excellent progress is being made and properly designed equipment will probably result in the elimination of most and possibly all of the foam.

However, it is not certain as yet that foam will ever be completely eliminated and the remedy in this case and in the case of existing apparatus which it might be considered wasteful to replace immediately, will be to require the heating of the atmosphere above the milk by means of either steam or hot air.

All pasteurization plants have steam available and the introduction of a small jet of steam above the body of the milk will be a simple procedure. A trap should, of course, be provided so as to prevent any water of condensation in the steam line from reaching the pasteurization chamber. The condensation of steam in the chamber itself will be insignificant in quantity.

LEAKY VALVES

Another defect which cannot be offset by either 142° F. or 145° F. is that of leaky valves. Practically all valves used in milk work will leak sooner or later due to the inevitable scoring of the valve seat in service. If the valve in question is an influent valve connected to the unpasteurized raw milk supply, raw milk will leak into the pasteurization chamber during the holding period. This leakage will, therefore, not have been held for the full required holding period, and cannot be considered as having been effectively pasteurized.

On the other hand, if the valve in question is an effluent valve, any leakage taking place before the milk in the pasteurizer has been held for the full holding period, will contaminate the pasteurized supply with which the effluent fitting may be connected. The correction of this defect lies, of course, in either disconnecting the holder from the effluent system entirely during the filling, heating and holding period, and disconnecting from the influent system during the heating and holding period; or of substituting for the present valve one of the recently designed leak escape valves. These leak escape

valves are designed with a leak port which captures any leakage and leads it to waste.

In the case of plug type valves permitted in influent fittings this leak escape device consists of vertical grooves in the plug face. In the case of flush type valves used in effluent fittings the leak escape device consists of a leak port located between two valve seats. The port is closed when the valve is open and open when the valve is closed.

Another design defect which must be corrected is that effluent valves become contaminated with leakage during the filling, heating and holding period. This contamination is not avoided, of course, by the leak escape feature above described. For this reason either a manual or automatic steaming of effluent valves is recommended just prior to the discharge of pasteurized milk from any holder.

EFFECT OF UNEQUAL TEMPERATURES

A defect found in long distance flow holders as a result of the Public Health Service studies is the existence of unequal temperatures in the air surrounding the holder tubes. The variation found has been as much as 19° F. This should be corrected by requiring thermostatically controlled heating of the air in the holder. Agitation of the air in the holder may further prove necessary in order to insure sufficiently even distribution of temperature.

The above is merely a tentative list of defects thus far studied and will probably need to be augmented as the studies proceed.

In general, it is desired to reëmphasize the fact that no mere fixing of definition temperatures will offset the serious danger produced by these defects, and it is believed that health officials will be well advised to devote immediate attention to their correction. In the meantime experimental work should be pushed as rapidly as possible to determine the safety margins which must be provided for correctly designed apparatus.

SPECIFICATIONS OF PASTEURIZATION APPARATUS

Following is a tentative draft of specifications of pasteurization apparatus which are suggested for use pending further developments in pasteurization apparatus studies:

VAT TYPE APPARATUS

(Milk heated in the holder)

(a) The apparatus should be so designed that every particle of milk will be agitated during the entire heating period. This disbars any apparatus containing "cold pockets" or pipe sections which are beyond the influence of the agitation device.

(b) The vat must be either disconnected entirely during the holding period from any influent piping, and during the filling, heating, and holding period from the effluent piping, or must be provided with leak-escape valves which will not permit any unpasteurized milk to enter the vat during the holding period or any incompletely pasteurized milk to escape into the effluent piping at any time.

(c) The lids of vats must be kept closed during operation, and so designed that nothing on top thereof will drop into the vat if opened.

(d) Every vat should be provided with an indicating thermometer, as well as a recording thermometer. The indicating thermometer should be accurate within 1° F. The recording thermometer should be checked daily by the plant operator, and at least bi-weekly by the health officer. The indicating, and not the recording thermometer, should be used as an index of temperature by the plant operator.

(e) All effluent fittings should be steam sterilized, either manually or automatically, immediately before discharge of the pasteurized milk.

(f) Designs which permit foam formation, whether in large or small quantities, should be equipped with a steam or hot air device which will keep the atmosphere above the body of the milk at a temperature equal to at least that of the body of

the milk. If steam is used, the steam line should be provided with a trap properly designed to avoid the discharge of water into the body of the milk.

POCKET TYPE APPARATUS

(Milk heated before entering holder)

(a) The apparatus should be so designed as to be free of "cold pockets" or pipe sections, the milk in which will drop below the recorded temperature before discharge from the pocket.

(b) The influent and effluent manifolds should each be provided with both recording and indicating thermometers. Indicating thermometers should be accurate within 1° F. The indicating, and not the recording thermometers, shall be used as an index of temperature by the plant operator. Recording thermometers should be checked daily by the plant operator and bi-weekly by the health officer.

(c) All influent and effluent fittings should be designed (leak escape valves or other satisfactory solution) so as not to permit any unpasteurized milk to enter the pocket during the holding period, or incompletely pasteurized milk to enter the effluent manifold at any time.

(d) Lids of pockets must be kept closed during operation, and so designed that nothing on top thereof will drop into the pocket if open.

(e) Designs which permit foam formation, whether in large or small quantities, should be equipped with a steam or hot air device which will keep the atmosphere above the body of the milk at a temperature equal to at least that of the body of the milk. If steam is used, the steam line should be provided with a trap properly designed to avoid the discharge of water into the body of the milk.

(f) All effluent fittings should be steam sterilized, either manually or automatically, immediately before discharge of the pasteurized milk.

CONTINUOUS-FLOW-TYPE APPARATUS

(a) No continuous-flow-type apparatus should be used which has not been tested by the health officer or by another proper authority to determine the operating conditions which must be observed in order to insure the uniform application of the desired time and temperature.

(b) Influent and effluent piping should each be provided with both recording and indicating thermometers. Indicating thermometers should be accurate within 1° F. The indicating and not the recording thermometers should be used as an index of temperature by the plant operator. Recording thermometer should be checked daily by the plant operator, and bi-weekly by the health officer.

(c) The holder should be free of any "cold pockets" or pipe sections, the milk in which will drop below the recorded temperature before discharge.

(d) All continuous flow apparatus should be provided with thermostatic control, properly designed to maintain a uniform temperature, both in the milk and in the heating medium surrounding the milk.

DEFECTIVE DESIGNS BEING CORRECTED

Lest this paper be used as propaganda against pasteurization, it is desired to state that while testing work thus far done by the Public Health Service has disclosed many defective types of apparatus, it has also shown that most of the defective types are being immediately redesigned as fast as the testing work discloses defects, and that testing work already done on improved designs has shown satisfactory results.

Furthermore, attention is called to the fact that in most cases the necessary modifications of apparatus now in use can be made in the field; that is, without the necessity of returning the apparatus to the factory.

BASIS OF DISCUSSION

The discussion in this paper is based upon the fact that practically all definitions of pasteurization rest upon the acceptance of only one point upon the minimum lethal curve. The possibility must be anticipated, however, that other

points on the curve may in the future receive wide acceptance, and that future definitions may need to be modified accordingly.

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A DAIRY INFECTION WITH STREPTOCOCCUS EPIDEMICUS DAVIS*

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IN THE LATTER part of April, 1926, attention was called to one of the very best dairies supplying milk to the city of Madison, Wisconsin.

For years the bacteria count of the milk of this dairy had been very low, usually only a few thousand per c.c., but suddenly the count jumped to over 150,000 per c.c. About the same time, several physicians reported to the health department a number of cases of septic sore throat, in their own families and among their patients, and stressed the fact that they were all users of the milk from this particular dairy.

The clinical histories of these cases followed a rather definite course—malaise, aching of the back and extremities, headache, chills, and fever, with a pharyngeal angina. This persisted throughout the attack which lasted 24 hours or longer, unless there were complications of the middle ear or mastoid. The pharynx appeared fiery red, was very dry and glistening, at times almost purple, and the inflammation extended into the nasopharynx. The fever was high—103° to 104° F.—and dropped by crisis.

This dairy having about 30 cows delivered about 300 quarts of milk daily to 150 families. Thirty-eight of these families had one or more cases of severe sore throat, totaling 63 cases in all. There were no deaths. On the other hand, it is quite certain that a considerable number of similar cases of sore throat occurred among those not on this milk route, and it is not possible to account for them as contacts.

ANALYSIS OF MILK

As soon as this state of affairs came to the attention of the health department, the dairyman was called in and questioned about conditions on the farm, and especially about mammitis among the cows. At this conference arrangements were made for pasteurizing the milk and a veterinarian was ordered to examine the herd for symptoms of mammitis. Later in the day the veterinarian brought to the laboratories of the Department of Agricultural Bacteriology of the University of Wisconsin 3 samples of milk from cows numbered 1, 2, and 3. These cows were regarded by him as suffering from mammitis.

The milks were plated on blood agar and the next day No. 1 showed only 200 bacteria per c.c. while No. 3 showed 600,000 bacteria per c.c., but in neither case were there any hemolytic colonies present. The plates made from the milk of cow No. 2, however, revealed the enormous number of 36,000,000 bacteria per c.c., and, furthermore, these bacteria were apparently all hemolytic streptococci of the *beta* type. This organism was isolated in pure culture and was found to hemolyze strongly in the test tube and to

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possess a capsule. These characteristics were regarded as strong presumptive evidence that this organism was *Streptococcus epidemicus* Davis, which subsequent tests confirmed.

The same day that capsules were found, the third day after plating, representative samples of the entire raw milk supply of this dairy, which at this time included the milk of cow No. 2, were plated. One of these samples was found, in due course, to contain *Streptococcus epidemicus*. The next day cow No. 2 was removed from the herd and the milk from the remainder of the herd was examined, each cow's milk being plated separately. All these tests proved negative to *Streptococcus epidemicus*, and the herd appeared to be clean.

Representative samples were examined four days later without finding any suspicious organisms, but three days after that, one of the samples showed a capsulated, hemolytic streptococcus. This led to the reculturing of the milk from the individual cows, with the result that another cow, No. 8, was found positive to *Streptococcus epidemicus*. This cow was removed from the farm and the milk from the remaining cows was cultured daily for some time and later at longer intervals over a period of nearly three months, but *Streptococcus epidemicus* was not found again.

TRACING INFECTION IN COWS

Contemporaneous with the work on the milk, an attempt was made to locate the source of infection in the cows. From previous studies[5, 3, 4] it seems probable that milk-borne septic sore throat is caused by the infection of the cows from a human source. Hence, swabs were made from the nose and throat of all persons in the dairy in question.

Out of 10 persons examined 2 yielded cultures of *Streptococcus epidemicus*. One of these 2 persons was one of the women in the house. She never had any part in the handling of the milk and no doubt became infected from drinking the milk as other persons had on the route. She had very slight clinical symptoms but carried the organism for a little over 2 months. The other person was the hired man, whose chief duties were the care of the cows and milk. He had come quite directly from army service to this dairy a little over a month before the cases on this milk route were recognized. So far as sore throat is concerned, his previous history is undetermined. He, himself, declared that he had not had sore throat within his memory. The nurse who swabbed his throat reported it inflamed, although he said it was not sore. The particular cows reported above as being infected were among those regularly cared for and stripped by him after using the milking machine. After he left the dairy *Streptococcus epidemicus* was never found in the milk.

LABORATORY METHODS

The laboratory methods used for plating the milk and identifying *Streptococcus epidemicus* were those reported by Brown, Frost, and Shaw,[2] and may be briefly summarized as follows: Veal-infusion-blood-agar plates were made of the milk, which is usually diluted 1 to 20, and incubated about 24 hours at 37° C. All hemolytic colonies of the *beta* type are fished into veal-infusion-broth and the next day tested for hemolytic power. Those which hemolyze in 2 hours are transferred, first, to blood agar slopes to be examined for capsules, and second, to veal broth tubes containing the following test substances: dextrose, lactose, saccharose, mannite, salicin, and sodium hippurate. *Streptococcus epidemicus* produces a quite characteristic *beta* colony on blood agar plates; has a high hemolytic titre; is a low acid producer in dextrose broth (pH around 5.1); ferments lactose, saccharose, and salicin; does not ferment mannite nor does it hydrolize sodium hippurate. *It shows a capsule* when the growth from a young moist agar slope culture is examined in a wet India ink preparation.

This particular type of Streptococcus has been quite universally found in epidemics of septic sore throat, as a restudy of all of the available cultures, since the Boston epidemic of 1911, has shown.[2]

STUDY OF INFECTED COWS

The cows, Nos. 2 and 8, infected with *Streptococcus epidemicus* from this dairy farm were brought to the University of Wisconsin Isolation Barns for further study. The infection in cow No. 2 was quite acute at the time of detection. The hemolytic streptococcus content was 36,000,000 per c.c. of the milk. We have never found more than about 2,000 *Streptococcus epidemicus* in the other cow, No. 8.

One of the primary purposes of a study of these cows has been to determine how long this type of infection would persist. Upon their arrival at the University these cows were turned out to grass, and it was a week or more before bacteriological analyses were made. Whether because of a change of ration, some other new factor in the environment, or because of the natural limitation of the infection, it is a fact that *Streptococcus epidemicus* has never been found in the milk of cow No. 2 since she was brought to the University. These organisms similarly disappeared from cow No. 8 for 3 months but then reappeared and have persisted in small numbers for 2 months to date. There is a possibility that this is not a recrudescence but a new infection. The possibility of this comes from the fact that she has been in close contact with an infected cow all of the time.

By way of summary it may be said that the method of detecting *Streptococcus epidemicus* in milk used in this work enabled us,

To find this organism in a milk supply suspected of spreading septic sore throat

To pick out the infected cows

To find the probable source of infection in the cows, namely, one of the milkers

By frequent bacteriological examinations to keep this milk supply free from this organism, and

To show that cows once infected by *Streptococcus epidemicus* are liable to remain sources of danger for long periods of time and probably should never be returned to the milking line.

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DOES INFANT WELFARE WORK OPERATE TO PRESERVE THE UNFIT?*

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IT IS a fundamental tenet among the practitioners of preventive medicine that premature morbidity and mortality should be reduced to the practicable minimum. The program of public health administration in no wise contemplates the "preservation of the unfit." The avowed aims are the elimination of insanitary conditions in the environment of man, the provision of safe and adequate food supplies, the proper disposal of personal and community wastes, the reduction of communicable diseases, the specific immunization of individuals against certain parasitic diseases and the education of the public in the practice of personal hygiene.

Among the specific problems that have occupied the attention of sanitarians, with few have they coped more successfully than those associated with the excesses of infant mortality. The machinery of infant welfare work has been extensively developed and standardized among progressive peoples, and especially in their urban communities. It has come to pass that the saving of infant lives is generally proportional to the sum of money available to the public and private welfare agencies concerned with the longevity of infants. The achievements of preventive medicine in the reduction of infant mortality in the United States, as in other countries of the world, rank among the notable accomplishments of modern times.

The program for the control of infant mortality has not been without its critics. Its indictment at the hands of certain students has been based upon the allegation that infant welfare work operates to preserve the unfit, to preserve those who in the normal course of events succumb to the decimating influences of the ruthless forces of natural selection. The artificial reduction of infant mortality has been branded with the stigmas of a dysgenic function, and of misdirected humanitarianism.

It is obvious, from the very nature of the problem, that the ultimate and final effects of infant or other welfare work upon the hardiness of man and of his fitness to his environment will not be demonstrable until the history of subsequent generations is written and until the records of their longevity are available to scholars of a later day. In the meantime, sanitarians have justified their tenets merely upon the contention that the accomplished reductions in infant mortality have not been directly concerned with the problem of biological or, more specifically, genetic fitness. The deaths among infants from diarrheal conditions and from communicable infections of the respiratory tract have been significantly reduced; but the mortality resultant from premature birth, from congenital debilities and malformations and from the injuries sustained at birth has maintained an approximately constant level. In the United States, for example, the death rate from diarrhea and enteritis has been reduced from some 40 or 50 (deaths per 1,000 infants) to approximately 20 in the quarter century since the year 1900. In the same period, the death rate from mal-

* Read before the Vital Statistics Section of the American Public Health Association at the Fifty-fifth Annual Meeting at Buffalo, N. Y., October 12, 1926.

nutrition, premature birth, congenital debility and injuries has actually increased from less than 40 to approximately 45. The increase is generally considered to be merely a concomitant of improvements in the accuracy of diagnosis and reporting of causes of death.

There is no substantial body of evidence to warrant an assumption that the infant who is preserved from the untoward effects of rotten or even infected milk, from hot weather, or from the consequences of being fondled and kissed by the parent or child with a snuffling cold, is any the less fit to live, grow and reproduce than the infant who is breast-fed or is more wisely nursed and more effectively quarantined by a wiser mother. Nor is there any evidence of dysgenic consequences attendant upon the reduction of the incidence of congenital defects by the practices of prenatal hygiene among pregnant women.

RELATION OF INFANT MORTALITY TO MORTALITY IN LATER YEARS

In this discussion I am not directly concerned with the problems of birth control and I intend to omit entirely direct references to the controversial arguments for or against the restriction of conception. I have no case at this time for or against the production of large numbers of babies or the maintenance of a rapidly growing, a stationary, or even a numerically declining population. I do present an argument for the conservation of those infants that are already born. I ask you to cast your eyes back with me to an after-judgment on what has been happening to the infants that have been born. Can we discover whether the efforts of sanitarians have operated to keep alive infants that otherwise would have died? Have such efforts operated to preserve infants who are not adequately equipped and who are therefore unfit to live?

In the conduct of an analysis of this sort the intensive method, the study of individual cases is obviously impossible. We must have recourse to the extensive methodology of statistics; we must deal with large numbers.

From a study of the intensity of natural selection reported in 1911, Dr. E. C. Snow concluded that high mortality in infancy is followed by a correspondingly low mortality in childhood, and *vice versa*. He inclined to the view that infant welfare work is dysgenic. The same general conclusion has been reached by a number of other investigators, among whom may be enumerated Popenoe and Johnson, authors of a well-known text on eugenics. On the other hand, Dr. Brownlee has found that high infant mortality is correlated with high mortality in the years 1 to 5 and *vice versa*. Major Greenwood and Dr. Brown some years ago reported an analysis on the rôle of economic and other factors in affecting infant mortality. They came to the conclusion that economic forces were not so specifically important in the particular body of data they studied in determining the magnitude of infant mortality rates as were certain other factors. They suggested that pathologically inferior stock is the important factor in excessive infant mortality. The limited space at my disposal here does not permit a detailed analysis of the report by Greenwood and Brown. I may only say that the mathematical methods which they used, however exquisite *per se*, were applied in a manner as thoroughly unjustified as their conclusion is unsound.

WORK FOUNDED ON EXPERIENCE

Although I can agree with Professor Raymond Pearl of Johns Hopkins University that efforts to control infant mortality have in the past been attempted with considerable success, I cannot agree with him that it is any indictment of these efforts to say that they have been based upon empiricism. What better basis can there be in a matter of this sort than practical experience? Health officers, physicians, nurses, dietitians, and others have not needed erudite, mathematical methodology to teach them a plain and simple

lesson. They learned from simple observations that many unnecessary deaths of infants from the combined effects of bottle feeding, of rotten milk and hot summer weather are easily prevented by breast feeding or by clean milk and cool homes or cool infant welfare stations. They learned that deaths of infants from colds, pneumonia and bronchitis can be prevented by teaching affectionate but misguided parents to keep away from the infant all persons who have coughs and running colds and who are so frequently overcome by irrepressible desires to kiss the mouth of the infant. It would be a sad story if we could ascertain how many innocent children have been kissed into their graves.

CHICAGO STATISTICS BASIS OF EXPERIMENT

The statistical experiments which I wish to present to you very briefly were undertaken specifically to cast some light upon some of the problems which I have given cursory mention. Let us suppose, for a moment, that the intervention of a well directed program of preventive and therapeutic medicine may have reduced infant mortality in two ways: (1) by the preservation of children who are born with an inadequate equipment to withstand "the slings and arrows of outrageous fortune"; and (2) by safeguarding others who might otherwise perish for lack of dietary and environmental controls that are coördinate with the hazards of being an infant. Is it not as probable that the possibly dysgenic consequences of the program are at least counterbalanced by the salutary effects of infant welfare work upon children who are unquestionably "fit" and who might, for lack of such welfare work, contract mild or severe, non-lethal illnesses that would contribute to their premature mortality in subsequent years of life? It is certainly reasonable to assume that for each infant life that is saved by this or that public health measure there are one, two, three or more infants who are preserved from sickness and consequently from organic injury that may serve as a secondary or contributory cause of death in the second, third or later years of life of the same infant. Hence, it is to be anticipated that variations in the mortality rate of infants will be found to parallel closely variations in the mortality of the *same* infants in subsequent years of life. Indeed, Sir Arthur Newsholme has already demonstrated precisely this point for certain English counties.

Further, it may be expected that educational or other measures designed to reduce infant mortality will also operate to reduce mortality in the other years of early childhood. Excepting on these grounds, it is not easy to account for reductions in mortality in the second to the fifth years of life. The preschool years (2–5) have been until very recent years notably free from any direct public health program expressly designed to reduce morbidity and mortality. It is the period of life which is still outstanding for the neglect it has been accorded by public health authorities.

For the purposes of our studies we have elected to use the mortality statistics of white infants and children (0 to 10 years of age), born and residing in Chicago in the period of years 1900 to 1925 inclusive. The vital statistics of negro and other colored children were eliminated from consideration because of the highly migratory nature of the colored populations. The object of our first set of experiments was to study the correlations between the corresponding infant and childhood mortalities in each of the sixteen years, 1910–1925.

These computations were designed to demonstrate the extent of the correlation between variations in the mortality of the infants born in a calendar year and the rates of mortality for the same infants in their second, third, fourth and fifth years of life.

This type of computation was accomplished by correlating the death rates for infants (0–1 year of age) in the years since 1910 with the death rates for chil-

dren in the second year of life (1–2 years of age) in the years since 1911, with the rates for 2–3 year old children since 1912, with the rates for 3–4 year old children since 1913 and 4–5 year olds since 1914. Thus, we may say that, by comparison with the death rates for 0–1 year, we have set back the data for:

1–2 year old children	1 year
2–3 year old children	2 years
3–4 year old children	3 years
4–5 year old children	4 years

We have computed for these sets of data the coefficients of correlation. Such a coefficient is a numerical measure of the tendency of two sets of data to vary or fluctuate in a parallel manner. The coefficients may range, in absolute value between +1.0 and —1.0. If the coefficient has the value of +1.0, it signifies that when a datum in series *a* is above the average value for the *a* series, its corresponding datum in the series *b* is proportionately above the average for the *b* series, and *vice versa*. If the coefficient is 0, it signifies that there is no relation between variations in the values of *a* and of *b*. If the coefficient is —1.0, the significance is the same as when the value is +1.0, except that high values of *a* are paralleled by low values of *b*, *i.e.*, the correlation between *a* and *b* is inverse. Values between +1.0 and 0 or between 0 and —1.0 represent definite but less than perfect correlation. In Table I, the coefficients for the data 1910–1925 are presented with their probable errors.

TABLE I

CORRELATIONS BETWEEN THE MORTALITY OF WHITE CHILDREN IN INFANCY AND IN SUBSEQUENT YEARS OF LIFE

Chicago, 1910–1925

r=coefficient of correlation
P.E.=probable error of r
1, 2, 3, 4, 5=the successive years of life (as described in the text)

Coefficient	$r_{1,2}$	$r_{1,3}$	$r_{1,4}$	$r_{1,5}$
r	+.875	+.737	+.720	+.802
P.E.	±.040	±.083	±.090	±.069
r/P.E.	21.9	8.9	8.0	11.6

It is seen from the data in Table I that all of the coefficients are significant in magnitude and are large by comparison with their probable errors. They are, variously, 8 to 26.5 times their probable errors. They tell us that if the infant death rate was high in a particular year, the death rates in the age periods 1–2, 2–3, 3–4, and 4–5 were high in the first, second, third, and fourth succeeding calendar years respectively, and *vice versa* when the death rate was low. This is as near as we can come, methodologically, to measuring statistically the relation between high or low death rate in the first year of life with mortality in the subsequent years of life. If you will permit me the assumption that Chicago's children who were 4–5 years of age in 1914, 3–4 in 1913, 2–3 in 1912, and 1–2 in 1911 were for the most part the children who survived the first year of life in Chicago in 1910 and, similarly, for the other children of the period 1910–1925, our correlation coefficients come then to mean that the higher was the death rate in the first year of life, the higher it was in the subsequent years of the first quinquennium, and *vice versa*. To check this assumption we have sought in the records of the Chicago Health Department the birth records of the children whose death certificates provide the basis of our mortality statistics. From an inspection of some 50,000 certificates it was found that the assumption introduces an error which is, on the average, less than 10 per cent.

In this first statistical experiment, I restricted the data to the vital statistics for the years since 1910. This was done because it is quite certain, from evidence internal to the data, that they are more accurate than the data for earlier years. It is of interest, however, to see what the data show when the correlation coefficients are computed in an entirely similar manner from the vital statistics for the years 1900–1925. In addition to the data similar to that presented in Table I, I have added in Table II the coefficient of correlation between the death rates of 0–1 year of age and the death rates for the 5 year period 5–9 years of age, the latter set back 5 years. This correlation was not included in Table I because the 5 year set back would restrict the series to very

few items when the data for only 16 years are being studied.

TABLE II

CORRELATIONS BETWEEN THE MORTALITY OF WHITE CHILDREN IN INFANCY AND IN SUBSEQUENT YEARS OF LIFE

Chicago, 1900–1925

Coefficient	$r_{1,2}$	$r_{1,3}$	$r_{1,4}$	$r_{1,5}$	$r_{1,5-9}$
r...	+.824	+.513	+.759	+.716	+.590
P.E....	±.043	±.101	±.060	±.070	±.096
r/P.E....	19.2	5.1	12.7	10.2	6.1

The data in Table II display the same high correlations for the years 1900–1925 that were evidenced by the data for 1910–1925.

The coefficients of correlation which have been presented tell us that in parallel with fluctuations in the death rates of infancy above or below the average death rate for a period of years, there have been similar fluctuations in the death rates for subsequent years of life of the same infants. We might raise the question: How much change in the death rate for the age period 1–2 is associated with unit change in the death rate of infancy? How much for the age period 2–3, 3–4 or 4–5? The answer is found in the computation of regression lines. From these it is discovered that for the years 1910–1925, the increase or decrease of the infant death rate by 10 points, *i.e.*, 10 deaths per 1,000 infants, was associated with increases or decreases in the death rates of the subsequent years of life by the following amounts:

Subsequent age period Years	Change in the death rate for a change of 10 points in the death rate of infancy
1–2	4.4
2–3	1.7
3–4	1.3
4–5	1.2

These figures mean that in the period of years 1910–1925 associated with each ten infant lives that were saved by reductions in the infant death rate there were 4.4 lives saved among children in the second year of life, 1.7 in the third, 1.3 in the fourth, and 1.2 in the fifth year of life.

Now, let us recall that the general trend of all death rates in each of the first five or ten years of life is downward. Thus, for example, since 1900, the death rate in infancy in Chicago declined approximately from a rate of 140 (deaths per 1,000 infants) to 85; in the second year of life from 43 to 14; in the third year from 19 to 6; in the fourth year from 12 to 4; in the fifth year from 10 to 3; and in the second quinquennium (5–9) from 5.5 to 2.5. It might be objected that the correlations which have been discussed are spurious and measure only the general tendency of all the death rates to decline. There are plain evidences in the original data that this objection is not valid. Nevertheless I have undertaken a direct statistical proof to meet the hypothetical objection.

The procedure utilized in avoiding spurious correlation due to secular or long-time trend was as follows:

1. For each set of death rates for a specific year of life, for the years 1900–1925, the general trend of the rates to decline was determined by finding a straight line that best described this trend. (This line was located by the method of least squares.)

2. From the equation of each of these lines was calculated for each of the 26 years in the period 1900–1925 the death rate which would have occurred if the death rates had declined in a perfectly uniform manner, along a straight line.

3. The difference was computed between the death rate which actually occurred in each year and the death rate which was calculated from the equation of the trend line.

4. Using these differences between the actual and the calculated death rates, a new set of correlation coefficients were calculated by the methods which have already been described.

The new coefficients represent, then, the correlation between fluctuations above or below the *trend* line (instead of fluctuations above or below the average) for the death rates of infancy and the death rates of each of the subsequent years of life of the same infants. The results are presented in Table III.

The data in Table III show that fluctuations in the death rates of infancy are definitely correlated with the death rates of the same infants in the subsequent years of their lives. There is just a reasonable chance that the coefficient $r_{1,6}$ (for ages 0–1 : 5–9) is insignificant by

TABLE III

CORRELATIONS BETWEEN MORTALITY IN THE FIRST AND IN SUBSEQUENT YEARS OF LIFE

The data used were first freed of long-time trends.

	Data sent back
1=Death rate per 1,000, age 0–1	.....
2=Death rate per 1,000, age 1–2	1 year
3=Death rate per 1,000, age 2–3	2 years
4=Death rate per 1,000, age 3–4	3 years
5=Death rate per 1,000, age 4–5	4 years
6=Death rate per 1,000, age 5–9	5 years

Coefficient	r	±	P.E.	r/P.E.
r1, 2	+.597	±	.087	6.9
r1, 3	+.512	±	.102	5.0
r1, 4	+.438	±	.114	3.8
r1, 5	+.513	±	.106	4.8
r1, 6	+.320	±	.124	3.2

comparison with its probable error. For the others, there can be little doubt that the correlations are statistically significant. It appears justifiable to conclude that the positive (+) correlations between fluctuations of mortality in infancy and in subsequent years of life are real and not spurious.

SUMMARY

In summarizing this hasty analysis of an important problem, it is almost gratuitous to reiterate the several points. It is plain that the data which were examined provide no evidence to substantiate the indictment of infant welfare work on the ground that it operates to preserve the unfit. Contrariwise, it would appear that there have been adduced significant evidences that the saving of infant lives is followed by associated savings in the subsequent years of life. I can find no evidence for, and much that is opposed to the view, that the savings in subsequent years of life would have been greater if there had been no reductions in infant mortality. The data which were presented have been checked and confirmed in detail by similar correlation coefficients computed for each of the principal groups of causes of infant deaths taken separately—diarrheal, congenital and "all others." These further computations have demonstrated that high or low infant mortalities from diarrheal causes have been followed by corresponding mortalities from all causes in the four subsequent years of life. It was not surprising that variations in congenital mortality were not correlated with mortality in subsequent years.

It has been found, also, that infant mortality, whether from all causes, from diarrheal or from congenital causes, fluctuated synchronously with the general mortality of the population. The discovery of a significant positive correlation between mortality from congenital causes and the general mortality of the entire population appears to emphasize the rôle of environmental factors in determining the incidence of congenital debilities and malformations.

Everything that has come out of our statistical studies tends to emphasize the validity of a dictum enunciated many years ago by Farr: "In addition to the immediate accomplishment in life saving, infant welfare operates to preserve fitness by reducing the incidence of damaging but non-lethal sickness. Nothing has appeared in our data to indicate that infant welfare work operates to preserve the unfit. So far as evidence has been obtained from Chicago's vital statistics for the years 1900–1925, it appears that reductions in infant mortality have operated primarily in a manner to conserve the natural hygienic resources of infancy and childhood."

NOTE: For a more detailed report of these studies, cf. *J. Prev. Med.*, I, No. 2, 1926.

CAN COLLEGE HYGIENE BE MADE EFFECTIVE IN THE LIFE OF COLLEGE STUDENTS?

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THIS is the second of the series of articles on "Teaching Health in College." The first article, "The Teaching of College Hygiene," by John Sundwall, Ph.D., M.D., University of Michigan, appeared in the January issue.

"Laboratory Aspects of College Courses in Hygiene," by Hugh Grant Rowell, M.D., Teachers College, Columbia University, will be published in March.

These papers were read at the Fifty-fifth Annual Meeting of the A.P.H.A. in Buffalo, New York, October, 1926.

THIS QUESTION may be discussed with greater mutual understanding if it is resolved into several constituent questions: *First,* What is college hygiene? *Second,* How do you know when the college hygiene program is effective in the life of the college student? *Third,* Why are the current hygiene programs of colleges generally ineffective? *Fourth,* How can they be made effective?

The facts submitted in the discussion of these questions have been derived from analyses made of the programs of several hundred educational institutions and from my own experience of 30 years of staff service in college hygiene.

COLLEGE HYGIENE

What is College Hygiene? The significance of this term is defined by common college usage. The current practices in 202 colleges of liberal arts and science, teachers' colleges and normal schools in the United States make general use of 4 kinds of programs for the educational hygiene and health benefit of students.† They are described as programs of:

1. Informational hygiene
2. Student health service
3. Applied hygiene
4. Administrative hygiene

These 4 programs are occasionally integrated in a single department, known as a department of hygiene or physical education, but usually they are covered by two, three and sometimes even four separate departments in the same institution.

The main inclusions under each of these 4 programs are as follows:

1. *Inclusions of the current college practices designated here as informational hygiene programs.* The class-room or laboratory presentations of information concerning hygiene are designated here as "informational hygiene programs." One hundred and fifty-four required informational hygiene courses, given under 85 different titles, are reported in the colleges and normal schools under observation.

All these titles may be grouped and reduced to a classification under 4 headings as follows: (a) general hygiene, dealing with the sequences of cause and effect that produce, maintain, improve,

† The data presented in the paper are taken largely from the manuscript of a report on the status of hygiene programs in institutions of higher education in the United States, prepared by the President's Committee of Fifty on College Hygiene.

protect, injure, defend or restore somatic[1] or mental health; (b) individual hygiene, the applications of general hygiene by the mature, relatively independent individual for the production or defense of his own health; (c) family and other group hygiene, the applications of general hygiene by parents or other responsible persons for the health benefit of their associates and dependents in the family, school, factory or other living, work or play groups; (d) societal hygiene (social, public, community or intergroup hygiene), the applications of general hygiene through the laws, institutions, mores, customs, folkways and common usages of society or its constituent groups.

2. *Inclusions of the current college practices designated here as student health service.* These programs include organized arrangements for health examinations, consultations and conferences for students who are apparently well, and emergency, ambulatory, infirmary and hospital treatment for those who are sick. Four main purposes are evident in current college student health service programs: (a) to take care of sick students, (b) to find and help students take care of hidden, unsuspected diseases and health defects, (c) to protect well students and help them take care of themselves and (d) to teach hygiene to the student, informing and educating him concerning individual, family and societal hygiene by way of his medical examinations, consultations, conferences and treatments. The educational possibilities of the student health service are unique and important. Every professional meeting between a member of the staff and a student constitutes a class, a laboratory section or a seminar in hygiene with one student and one instructor.

3. *Inclusions of the current college practices designated here as applied hygiene.* This convenient term covers physical training, physical exercise, intramural sports and extramural sports. These anatomical, physiological and psychological activities are major factors of somatic and mental hygiene. They are essentially programs of individual and societal hygiene. The possibilities of educational hygiene are very great in the relations that are commonly established between students and their physical directors, teachers of athletics, and coaches. No more intimate relations are established in the college curriculum than between the student and his teacher, leader or coach in applied hygiene.

4. *Inclusions of the current college practices designated here as administrative hygiene.* The institutional offices, arrangements and regulations that are established for safeguarding the environmental hygiene of the student, faculty and employes are included in the term Administrative Hygiene. It involves the sanitation of buildings and grounds, dormitories, fraternity houses, sorority houses and other boarding or lodging houses patronized by students on or off the campus. It involves also the sanitation of leisure and loafing places, playgrounds and play places, food and water; the hygiene of the extra-curricular work of the student; the provision, stimulation and protection of wholesome student social life and the hygiene of curricula and schedules.

College hygiene is thus a composite program made up of programs of (1) informational hygiene, (2) student health service, (3) applied hygiene and (4) administrative hygiene—all maintained for the educational hygiene and health benefit of the student.

EFFECTIVENESS OF COLLEGE HYGIENE

What are the evidences of the effectiveness of college hygiene? One would recognize effective educational influences of college hygiene programs if he were to find reasonable evidences of the following characteristics among the men and women who have been under the influence of such programs:

1. The term "somatic health" is used here to designate bodily health as distinguished from mental health. It must be urged, however, that somatic and mental hygiene or health cannot be separated.

(a) They would have scientific attitudes, make scientific efforts and form intelligent, discriminating judgments in relation to matters of individual, family, school, occupational, community and public health—that is to say, in matters of individual, group and societal hygiene. (b) They would secure annual or semiannual health examinations for themselves, their children and their other dependents. (c) They would select their professional health advisers for appropriate purposes with experienced discrimination, placing faith only in the physician, clergyman, dentist, nurse or other health adviser whose scientific preparation, scientific effort and method and dependable character justify complete trust and confidence. (d) They could not easily be victimized by quack doctors, pseudo-scientific healers, fanatics, cultists or other poorly and unscientifically prepared practitioners. (e) They would select or know where to find appropriate scientific health literature, discarding the pamphlets, circulars, magazines, articles and books put out for unscrupulous commercial purposes or by fanatics or other incompetent persons. (f) They would choose wisely from the numerous local and national societies and other organizations engaged in health work, avoiding those that are inappropriate, prejudiced, irrational, unscientific, selfish or commercial. (g) They would practice wise habits of constructive and defensive individual hygiene. (h) The hygiene of their homes, their children and their employes while at work would show the transmitted effects of their college educational hygiene. (i) Their attitudes and influences on public health standards and public health practices would demonstrate the effectiveness of their college hygiene.

Effective college hygiene helps produce men and women who demand and support high standards of public health service and private health practice. A college man or woman who supports unscientific hygiene and unscientific medicine represents a failure of college education.

Unfortunately, not one of these 9 groups of characteristics significant of the effectiveness of college hygiene is commonly descriptive of college students or alumni. Any one of us could check through each group and find among his college friends and acquaintances and among other college men and women prominent in the public eye very few who do now show evidences of the failure of college hygiene according to these measurements. There is no question that college hygiene is not generally effective.

NUMEROUS DEFECTS IN PROGRAM

Reasons for the ineffectiveness of college hygiene program. In answer to the third question, it may be stated that college students and college graduates do not in general exhibit evidences of effective college hygiene because the deficiencies and defects commonly present in every one of the 4 major programs of college hygiene make it difficult if not impossible for them to be educationally effective.

Students enter college with fixed beliefs and faiths in matters of health that are traditional in their homes and their local social groups. They are born into them and grow up with them. Education involving change in their folkways, customs and mores of health is in class with education involving change in their fixed beliefs in their religions or politics. The student may have an open mind that is not excessively resistant to scientific facts that are or seem to him to be in opposition to the usages, attitudes, habits and sentiments of his people. Or he may reach college with firm prejudices concerning health and disease that he will not challenge or analyze. He knows they are true and refuses to entertain any facts in opposition to them. These beliefs are parts of the furnishings of the "logic-tight compartments" of the mind described by Bernard Hart.

College education in hygiene is, therefore, much more difficult than education in such subjects as language, history, literature and mathematics, that do not

ordinarily disturb deep-seated traditions or beliefs.

Unfortunately, college hygiene programs are in general *not* organized or maintained with the quality of personnel, educational conditions or instructional methods that experience has shown to be essential in all other college subjects and emphatically necessary in a subject that is so intimately a part of the traditional, superstitious, unreflecting usages, folkways, customs, attitudes and sentiments that constitute the mores of health.

OMISSIONS OF PROGRAMS

The outstanding deficiencies and defects that are responsible for the ineffectiveness of many college hygiene programs may be summarized as follows:

1. There are colleges of liberal arts and science, teachers' colleges and normal schools in the United States in which one or more of the 4 major programs of hygiene are omitted in whole or in part.

2. There are deficiencies and defects common to informational hygiene programs that make this educational effectiveness impossible. Current college programs of required informational hygiene commonly or frequently omit or largely neglect mental hygiene, sex-social hygiene, industrial hygiene and the defensive hygiene of the mechanical, physical and chemical injuries of health. There is also a common omission of family hygiene and community or public hygiene (*i.e.*, group and intergroup or societal hygiene).

The number of hours a week and the total number of terms given to required college informational hygiene courses are usually inadequate. The subject cannot be covered in the time ordinarily allowed.

The size or number of sections and the total number of students that one instructor is required to teach each week are often greater than one instructor can possibly teach effectively. Instructional overload destroys effective teaching as inevitably in hygiene as in any other subject.

The unaided lecture method for teaching college hygiene is in common use. This method has failed in all subjects wherever it has been tried with undergraduate students. The lecture method may succeed in entertaining undergraduates. It rarely helps them put their minds to work.

Required informational hygiene courses are reported in which students are not expected to prepare for class meetings. In others, so little student preparation is expected that there can be no educational return of a collegiate quality.

Tests of student acquisition and control of information concerning hygiene are frequently so meager and inadequate that they cannot measure the educational achievement of the student, assuming that there is an achievement to measure.

3. There are deficiencies and defects common to current college student health service programs that limit or prevent their effectiveness. The number of men and women on the student health service staff is commonly too small to carry an effective health service program. There are often so many students to a medical examiner that a thorough examination accompanied by confidential discussion and followed by appropriate advice and instructional information cannot be given every student.

In some institutions students are examined medically while they are dressed or partly dressed, making a good general examination impossible. Examinations are frequently made with a rapidity that precludes complete examination or confidential discussion.

No organized provision is made in some institutions for required conferences with students subsequent to their regular health examinations. The effectiveness of the regular examinations is indicated in part by the number of students that are followed up afterward in order to help them take intelligent care of themselves.

In some colleges no regular arrangements are made for the benefit of students who voluntarily seek help in the solution

of their problems of mental, somatic or social health. A busy voluntary health-conference schedule is generally good evidence of an effective program of college hygiene. A required program of health examination that is not accompanied by an active voluntary health conference schedule has failed educationally.

4. There are deficiencies and defects common to current programs of applied hygiene that make them indifferently effective or cause their failure. The number of hours a week and the number of terms scheduled for required applied hygiene is commonly inadequate for the production of lasting habits of physical exercise, recreation and play.

There can be no great educational effectiveness when the size of the sections in applied hygiene and the total number of students and the student hours assigned to the individual teacher each week produce an excessive instructional overload. The mass drills and other forms of mass instruction necessary under such conditions prevent individual instructional attention.

5. There are deficiencies and defects common to current programs of administrative hygiene under the influence of which there can be no consequent effective educational hygiene or adequate health benefit to the student. The offices, regulations and measures of administrative hygiene in colleges are not commonly organized into programs. They are usually not integrated with the other hygiene programs of the college. The educational value of an obvious application of the laws of hygiene by the administration of the college is generally lost to the student. Too frequently there is a wide difference between classroom presentation and curricular and extra-curricular application. The common deficiencies and defects of college administrative hygiene may be evident also in an official neglect of the physical and social environment of the student and of the hygiene of his curriculum and schedule.

POSSIBILITIES OF COLLEGE HYGIENE

Can college hygiene be made effective in the life of the student? Finally, in answer to the fourth question, which is the question given as the subject of this paper, it is safe to state that college hygiene *can* be made to produce the characteristics in students and graduates noted above in answer to the second question *only when all 4* of its major programs are organized, integrated and carried on in at least approximately complete form, under conditions favorable to educational effectiveness and in accord with tested productive educational methods.

There are colleges of liberal arts and science, teachers' colleges and normal schools here and there in the United States whose current practices demonstrate the practicability of organizing and maintaining programs of informational hygiene, student health service, applied hygiene and administrative hygiene in conformity with scientific, educational and administrative principles.

The factors in current college hygiene programs that promise effective influences on the lives of students and alumni may be summarized as follows:

1. There are current required informational hygiene programs here and there in the United States that (a) cover most if not all the basic facts as we now know them in general hygiene, individual hygiene, family and other group hygiene and in societal or public (intergroup) hygiene; (b) limit their sections to 20 students each, schedule their courses for 2 or 3 periods each week and continue the program for 4 or more semesters; (c) assign their teachers approximately no more than 60 individual students or 120 student hours a week; and (d) provide methods of instruction and aids to teaching that make students work, help them learn to think independently and give them understanding interest in hygiene.

2. There are current student health service programs that (a) provide one physician for no more than approximately 250 students; (b) require prematriculation

health examinations and subsequent periodic examinations (yearly or half yearly) and follow all important advice with required subsequent consultations; (c) require students to remedy all incapacitating defects, remove conditions dangerous to other students or leave college; (d) arrange schedules for voluntary health conferences so that students may secure unobtrusively expert confidential help with their mental, emotional, somatic, and social health problems; (e) provide emergency, ambulatory, infirmary and hospital treatment for sick students, and (f) plan deliberately to make every official relationship between the individual staff member and the individual student educationally effective.

3. There are current programs of applied hygiene, made up programs of physical training, recreation, intramural sports and extramural athletics that (a) proportion the size and number of sections and the number of students to each instructor so that the individual instructor in applied hygiene is educationally responsible for no more than from 120 to 180 student hours a week; (b) require applied hygiene for 3 or more periods each week throughout the entire undergraduate course; and (c) organize and maintain recreational activities and intramural sport and athletic programs that hold the active participatory interest of almost the entire undergraduate student body, men and women.

A required program that leads to a heavy voluntary student participation in habitual recreation and sport has gone a long way toward producing lasting habits of individual and societal hygiene.

4. There are current administrative hygiene programs that calculatingly provide not only for the routine sanitation of buildings and grounds but also for the hygiene of the living, work, study, leisure and play places of students on the campus, and within limitations, off the campus and safeguard the health influences of their curricular and extra-curricular experiences.

INTEGRATIONS OF FOUR MAJOR PROGRAMS

Finally, there are effective integrations of the 4 major programs of hygiene in current operation in a few institutions of higher education in the United States. Here and there colleges are found that integrate these 4 programs into a single program in a department of physical education or a department of hygiene under specially equipped teachers, full-time appropriately prepared physicians, consulting specialists, thoroughly competent directors and teachers of physical training, recreation, intramural sports and athletics and under experienced health officers—all for the end purpose of educating the student in the sciences and arts of hygiene for practical use in his own life, the life of his home and that of his community.

CONCLUSION

It is reasonable to maintain that the completeness of organization, the favorable educational and environmental conditions and the productive instructional methods now in current practice in each of the 4 major divisions of the college hygiene program here and there in the institutions of higher education in the United States justify the belief that college hygiene can thus be made effective in the life of the college student and through him in the home, the community and the public of which he will become a part and in which he is likely to become a leader.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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PREVENTION OF HEART DISEASE

DISEASES of the heart and blood vessels in their various aspects are attracting more and more attention on the part of public health administrators. Not very long ago these affections were generally considered as non-preventable and as not coming within the purview of the health officer. We have been slow in recognizing in a practical way, at least, that many of these troubles are true infections having their origin in what is generally called rheumatism. There can be no doubt that a large proportion of cases of rheumatism, estimated at not less than 40 per cent, develop chronic heart disease. Approximately 50 per cent of patients with acute rheumatism show some endocarditis, while in second and subsequent attacks the proportion of heart affection rises. Going back a step further there is just as little doubt that the tonsils are primarily responsible for much rheumatism. It is estimated that 50 per cent of those with acute rheumatism have enlarged or septic tonsils, and there can be little doubt that this condition plays an important rôle in the production of rheumatic affections. It is well known that dental sepsis produces neuritis and is closely connected with several types of rheumatic disease.

Here in a nutshell is the challenge to the worker in preventive medicine. Both of these primary conditions are preventable. In a very large proportion of cases they occur before the age of 15 years, and it is common knowledge that many cases of rheumatism pass unnoticed because of the old superstition so widespread among the laity, that the process of growth produces pains, and children suffering from rheumatism are neglected because they have only "growing pains," which are considered normal. Nothing is better established than the fact that a history of "growing pains" is given in many cases of arthritis, carditis and chorea. It is clear then that information should be given to the laity as far as possible that "growing pains" mean rheumatism, which is likely to cause permanent injury.

For the health officer and physician no argument is needed concerning the ill effects of infected tonsils and abscessed teeth, but perhaps it will not be amiss to warn those in authority that energetic measures are called for in having such conditions eradicated.

Among the predisposing influences the idea that climate, and especially dampness, plays a large part is deeply rooted. Almost always when such a widespread opinion exists, there is at least a germ of truth at the bottom. Studies in England, however, do not entirely bear out the generally accepted idea. Scotland, which

has the lowest mean temperature and the most rain, has a lower death rate from rheumatism than any English county group, while the southern counties of England, which have the highest mean temperature and the lowest rainfall, come next. Temperature and rainfall, therefore, do not of themselves seem to be factors, but it is possible that other influences may be at work. Certainly, apart from these figures, there is good reason for housing in dry and well ventilated quarters.

Among the opportunities offered to physicians, and especially to those who are in administrative positions, there are few more inviting prospects than the prevention of heart disease. The indications are as clear as in any other field of preventive medicine.

SAFETY AND QUARANTINE [1]

WE HAVE long been taught that disease travels no faster than human transportation and in this fact has rested much of the safety of our country in the past. We have felt ourselves to be free from danger of those diseases which flourish in distant countries because weeks, and often months, were required for vessels from them to reach our shores. The old fashioned sailing vessel was frequently six to twelve months at sea, so that there was comparatively little danger of it bringing disease to us. The airplane and the steam vessel have changed all of this. Increased facilities for transportation have not only rendered easy the introduction of communicable disease from one community into another, and from one state into another, but also from the most distant foreign countries into the United States. We need only call attention to the fact that the airplane has gone from coast to coast between the rising and the setting of the sun, and, while this is an exceptional instance, the commercial use of the airplane is constantly increasing and we may certainly expect to see it in common use in the near future.

These facts make it necessary to redouble our vigilance, and it is pleasant to be able to make the statement that our modern methods are effective to a surprising degree. A striking example of the efficiency of our methods occurred during the year at New Orleans, when a Japanese steamer arrived with two cases of plague among the crew. Four hundred and twenty-two rats, twenty-three of which were infected with bubonic plague, were killed. In the old days we should have had an outbreak in New Orleans, but under our modern methods it was stopped at the door.

In 1916 the late Dr. John Guitéras stated that bubonic plague was the greatest menace of the tropics to our country. A somewhat similar statement has been repeated since by the Surgeon General of the Public Health Service, and the wisdom of these observers has been proved by the occurrence of plague in several of our gulf ports since that time. It is safe to predict that, while this disease will unquestionably be brought to our doors from time to time, it will never gain a foothold nor approach anything like epidemic proportions in this country.

While modern methods of transportation have added to the risks of epidemic diseases, they have also been put to practical use in the prevention of certain diseases. The airplane has been used during the past year for the distribution of arsenical dust for the destruction of mosquitoes, with results which are full of

promise for suitable areas difficult to approach in other ways. The airplane has also been used in fighting the boll weevil of cotton.

There has been no importation of plague, cholera, yellow fever or other major quarantinable diseases during the year. Quarantine methods have been improved as our knowledge has advanced. They are now more efficient and less burdensome to commerce, as well as to travelers.

The end of the fiscal year 1926 has shown that we are fully abreast of the times and are gaining steadily in our control of the communicable diseases. Accomplishments demonstrating our wonderful control of quarantinable diseases in the present day will inspire confidence for our safety for the future.

1. Annual Report of the Surgeon General of the United States Public Health Service.

INSECTS AND DISEASE

A RECENT WRITER has made the statement that the struggle of the future will be between man and insects. Some such struggle has unquestionably gone on since the earliest times, and the non-habitability by the white man of many of the most fertile sections of the world has certainly been largely due to the presence of insects which carry disease. The writer just quoted had in mind more than diseases of man. In fact he was considering chiefly diseases of food producing plants, and the question which is of such rapidly growing importance—food supply for the race. We need only mention the ravages of the Hessian fly, the chinch bug, the various grain destroying weevils, the European corn borer, San José scale, codling moth, and the cotton boll weevil, which cause such tremendous losses and so much anxiety to our agricultural interests. Domestic animals on which we are dependent are also victims of insect pests and insect-borne diseases.

As far as man himself is concerned, we have grown accustomed to thinking of the house-fly as a bearer of typhoid fever and other intestinal diseases, the tsetse fly as the carrier of sleeping sickness, the flea as carrier of bubonic plague, mosquitoes as agents in transmitting malaria, yellow fever and dengue, the louse as carrier of typhus and trench fevers, the tick as carrier of Rocky Mountain spotted and relapsing fevers, and more recently we have learned of deer-fly fever (tularemia). Indeed the list is too long for mention here and additions are being made constantly by new discoveries.

The insect responsible for the transmission of Kala-azar is the most recent addition to the list, a disease which fortunately does not affect us in this country but which is none the less interesting from this general standpoint. A commission headed by Lieut.-Col. Christophers, working in India since 1924, has concluded that the sandfly (Phlebotomus argentipes) is the agent of transmission in this disease. The bedbug, which has been incriminated in the past, has been excluded by careful work, as has also the common louse. The commission has arrived at this conclusion, in spite of some facts which speak to the contrary, most of the evidence being so strong, that they "for the present" hold that the sandfly is the "probable transmitter." It was proved that 25 per cent of sandflies which bit patients became infected with the parasite in spite of the fact that they exist in very small numbers in the peripheral circulation. The great difficulty in accepting

this insect as the carrier lies in the fact that infected flies die after laying their eggs, within five days of their infection, but, as mentioned, other evidence was so strong that for the present at least the commission has felt itself compelled to reach the announced conclusion in spite of this difficulty.

It is certain that the public in general does not, and it is questionable if even the profession does, realize what a part insects play in, or rather against, our lives and well-being, and it may well be that the struggle for existence in the future will be between man and insects. It may even now have begun.

THE VALUES OF GENERALIZED NURSING

A REPORT just issued by the East Harlem Nursing and Health Demonstration* constitutes perhaps the most important single contribution that has been made to the important problem of the generalization of nursing service. In order to determine as completely as possible the relative value of the two types of nursing service, two adjacent areas were operated in parallel, one on the generalized and one on the specialized plan, and the keeping of a very careful and complete record made it possible to secure a complete picture of relative results obtained.

In regard to quality of work it was concluded after exhaustive study by a specially qualified investigator that there was little essential difference in the quality of the nursing service rendered under the two plans, but it appeared that the nurse who specialized tended to an overelaboration of technic and was primarily interested in the individual, whereas the nurse whose work was generalized showed a better conception of the essential unity of all family health work.

From the standpoint of volume of work performed the advantage was very much in favor of generalization. An equivalent staff in the two districts carried 1,075 families and 2,816 individuals under the specialized plan and 1,370 families and 4,116 individuals under the generalized plan. The visits paid were increased 40 per cent under the generalized plan (26,704 visits instead of 19,052). This increase was largely made possible by the fact that the proportion of nurse's time actually spent in the home was substantially increased as a result of the smaller districts and simplification of office work. The cost of a visit was therefore reduced from $1.23 under the specialized to $.89 under the generalized program.

The fear that under the generalized plan a nurse would be forced to neglect educational work for the care of acute illness was not justified. The proportion of visit time devoted to the care of sickness was only slightly increased, from 17 per cent to 26 per cent. The report concludes with a statement that "The administration of nursing services under the generalized plan simplifies many details of office management, supervision and record work. The training of the new worker requires additional time for each service included in the general program but this results in a comprehensive vision of the health field which makes for greater efficiency in all services."

The study should receive the careful attention of all who are interested in the development of the greatest possible efficiency in the field of public health nursing.

* A Comparative Study of Generalized and Specialized Nursing and Health Services, East Harlem Nursing and Health Demonstration, 354 East 116th St., New York City.

ASSOCIATION NEWS

A.P.H.A. TO MEET AT CINCINNATI

As we go to press announcement is made that the Fifty-sixth Annual Meeting of the AMERICAN PUBLIC HEALTH ASSOCIATION will be held at Cincinnati, Ohio, during the week of October 17, 1927.

Information regarding the meeting will appear in future issues of the JOURNAL.

COMMUNICABLE DISEASE REPORT

Health officers and other members of the Association will be interested to learn that the report of the Committee on Control of Communicable Diseases presented at the Buffalo meeting has been officially approved by the U. S. Public Health Service and published by the Service in *Public Health Reports* dated December 17. This report will also be published in full with a few minor corrections in an early issue of the AMERICAN JOURNAL OF PUBLIC HEALTH. Reprints are available from the American Public Health Association.

This report, which is a revision of the report made in 1916, summarizes our most modern knowledge of the control of communicable diseases and like the previous report will prove indispensable to all those who have to do with this important branch of public health work.

MEETING OF OHIO SOCIETY OF SANITARIANS

At the First Annual Meeting of the Ohio Society of Sanitarians held at Columbus, Ohio, in November the proposed affiliation of the Society with the A.P.H.A. was discussed. The subject was presented by Homer N. Calver, executive secretary of the A.P.H.A. The Ohio Society of Sanitarians voted to make formal application for affiliation according to the constitution and by-laws of the A.P.H.A. to come into the latter Association as a state section.

At the meeting the following committees were appointed:

Committee on Administrative Practice: W. H. Peters, Cincinnati, *chairman*; A. O. Peters, Dayton; F. M. Houghtaling, Sandusky.

Committee on Training and Personnel: Roger G. Perkins, Cleveland, *chairman*; E. R. Hayhurst, Columbus; A. C. Bachmeyer, Cincinnati; Marion G. Howell, R.N., Cleveland.

The following officers of the Society were elected:

President—H. L. Rockwood, Cleveland; 1st Vice-president—Alice Cogan, R.N., Columbus; 2d Vice-president—G. E. Robbins, Chillicothe.

New members of executive committee appointed were:

C. D. Barrett, Mansfield; Valloyd Adair, Lorain; Mabel Green, R.N., Columbus.

NEW MEMBER OF STAFF

Anna C. Phillips, who has been associated with Dr. Haven Emerson in his health and hospital surveys, has joined the staff of the American Public Health Association as Associate Director of Field Service. Miss Phillips will particularly give attention to hospital surveys which the Association is making in connection with community health studies. Special attention will be given to the relationship of the hospitals to other community health services.

ERRATA

The following changes should be noted in the Report of the Committee on Bathing Places, which appeared in the December, 1926, JOURNAL:

Page 1200, chapter XXV, *Bacterial Quality of Swimming Pool Waters:* The numbers of bacteria permissible under Sections *(A)* and *(B)* are reversed. These sections should read as follows:

"A. *Bacteria Count on Agar—2 Days—20° C.* (This count is optional): Not more than 10 per cent of samples covering any considerable period shall contain more than 1000 bacteria

per c.c. No single sample shall contain more than 5000 bacteria per c.c."

"B. *Bacteria Count on Agar or Litmus Lactose Agar—24 hours—37° C.:* Not more than 10 per cent of samples covering any considerable period shall contain more than 100 bacteria per c.c. No single sample shall contain more than 200 bacteria per c.c."

Paragraph (C) *Partial Confirmed Test,* should read as follows:

"Not more than two out of five samples collected on the same day, or not more than three out of any ten consecutive samples collected on different dates to show a positive test in 10 c.c. of the water at times when the pool is in use."

CORRECTION

On page 927 of the September, 1926, JOURNAL the statement was made "In April, 1926, we published the report of the Committee on Dairy Products and Eggs," whereas the report was published only in abstract form.

PUBLIC HEALTH NURSING SECTION

With the publication of the February issue of the JOURNAL a Public Health Nursing Section will be reëstablished. This section under the editorship of Miss Miriam Ames is planned to give public health workers information regarding the latest attainments and newest developments in the field of public health nursing.

Miss Ames is Assistant Director of the Visiting Nurse Service, John Hancock Mutual Life Insurance Company, Boston, Mass. She has been active in the national public health nursing program for several years, having been affiliated with the Maternity Center Association, New York City, and she formerly was maternity supervisor of the Community Health Association, Boston, Mass., and director of the Albany Guild for Public Health Nursing, Albany, N. Y.

LIST OF NEW MEMBERS

Lucy Marvin Adams, A.B., M.A., New York, N. Y., Secretary, Health Education, National Board, Y.W.C.A.
Henry C. Becker, M.D.V., Chicago, Ill., Department of Health, Bureau of Dairy Products
Nelson Pierrepont Crooks, M.D., Alhambra, Calif., Deputy Health Officer, Los Angeles County, Calif.
Charles N. Denison, M.D., Cheshire, Conn., Health Officer
Maurice J. Dooling, D.V.M., Syracuse, N. Y., Director, Bureau of Food Inspection
Filip Carolus Forsbeck, Boston, Mass., Massachusetts State Epidemiologist
Perry Dale Gaunt, M.D., Warsaw, Ill., District Health Superintendent
James Frederick Hazlewood, M.B., D.P.H., Toronto, Can., Director, Division of Laboratories, Department of Public Health
Tom A. Jackson, Eldorado, Kans., City Health Officer
Edwin A. Jenner, B.S., A.M., Fayette, Mo., Teaching Biology and Bacteriology in Central College
William H. Johnson, M.D., Buffalo, N. Y., Division Medical Officer for the New York Telephone Company
John J. Kerwin, B.S., Chicago, Ill., Junior Sanitary Engineer, City of Chicago Water Safety Control
Timothy J. King, Chicago, Ill., Supervising Food Inspector, Department of Health of Chicago
Mary Hester Lemon, Honolulu, Hawaii, Registrar General, Vital Statistics
Marie Kirwan, New York, N. Y., Publicity Assistant, State Charities Aid Association
Lunsford H. Lewis, M.D., Kingwood, W. Va., County Health Officer
R. C. Mahaney, M.D., Owosso, Mich., Health Officer
John J. McGah, Chicago, Ill., Supervising Health Inspector, Chicago Department of Health
Claire M. O'Brien, Buffalo, N. Y., Owner Buffalo Laboratory
Leon B. Reynolds, A.B., Stanford University, Calif., Professor of Sanitary Engineering
Frank C. Rodman, Natick, Mass., Manufacturer of Milk Bottle Covers (Assoc.)
Sterling Price Taylor, Jr., M.D., North Haven, Conn., Health Officer
Langdon Robert White, B.S., M.D., Washington, D. C., Industrial Hygiene and Sanitation, U. S. Public Health Service
William F. Wild, M.D., New York, N. Y., Staff Associate Division of Public Health Relations, American Child Health Association
Pauline Brooks Williamson, B.S., New York, N. Y., Head of School Health Bureau, Welfare Division, Metropolitan Life Ins. Co.

DECEASED MEMBERS AND FELLOWS

James R. Bean, D.P.H., Jacksonville Fla. Elected Member 1920—Fellow 1923.
Ernest S. Bishop, M.D., New York City. Elected Member 1918—Fellow 1923.
Julius Braumnagel, M.D., San Antonio, Tex. Elected Member 1890.
Emma Dolfinger, Forest Hills Gardens, L. I. Elected Member 1924.
Linon Horton, New York City. Elected Member 1915.
Dr. F. Thomas Kidder, Woodstock, Vt. Elected Member 1907.
Dr. Percy D. Meader, Baltimore, Md. Elected Member 1915.
J. C. Price, M.D., Trenton, N. J. Elected Member 1914.
R. C. Salter, D.Sc., Baltimore, Md. Elected Member 1920.
George N. Simpson, M.D., Warren, O. Elected Member 1918.
Sydney A. Smith, Hilo, Hawaii. Elected Member 1925.
Heman Spalding, M.D., Chicago, Ill. Elected Member 1906—Fellow 1922.
J. W. Thayer, M.D., Gilroy, Calif. Elected Member 1920.
Albion Young, M.D., Augusta, Me. Elected Member 1913.

BOOKS AND REPORTS

Modern Science and People's Health—*Edited by Benjamin C. Gruenberg. New York: W. W. Norton & Co.*, 1926. 250 pp. Price, $2.50.

Always a fascinating and absorbing subject, the story of health gains glamor from the skill and ability of its narrators. This book is a notable contribution to the literature on health and on science generally, not because it contains anything new, but because of the brilliance of its presentation. It consists of seven exceptional essays by as many well-known authorities, who apparently delivered them originally as lectures before highly intelligent and appreciative audiences. The style is uniformly conversational, aimed at the better informed laity, but of equal interest to the professional sanitarian and the physician.

The introductory chapter, by the editor, is entitled "Science in a Democracy." It seems to get under way a trifle ponderously, but as the writer warms up to his subject and pays his respects, with just the right shade of contempt, to those deluded individuals who can see nothing scientific, especially as it relates to medicine, the reader realizes that the foundation is well laid. Then an anatomist, Charles R. Stockard, Ph.D., M.D., explains the individual as a product of inheritance and environment, elucidating with much clarity such matters as the function of chromosomes and genes. A chemist, Hugh S. Taylor, D.Sc., carries on, with a description of the manner in which chemistry is aiding in the fight on disease. This chapter, "From Test Tubes to Living Things," is perhaps the most interesting one in the volume, but this is no disparagement of any of the others. Next comes an able exposition of science and nutrition by Walter H. Eddy, Ph.D. A psychiatrist, William A. White, M.D., contributes a chapter of the adjustments and unity of the organism, a chapter which is a bit more difficult to follow than some of the others. With his usual felicity of expression, C.-E. A. Winslow, Dr.P.H., then takes up the thread of the narrative and reviews the glorious struggle for the prevention of sickness and the prolongation of life. Finally, Haven Emerson, M.D., sums up under the title "Scientific Service and People's Health." Usually a graceful writer, Dr. Emerson seems somewhat more discursive and repetitive than is his custom.

The only complaint that might be made about this book is that there is not more of it. At least three more essays might well have been included. As it is, it offers to the cultured reader a valuable symposium on the noteworthy efforts made by science to conserve health. It is well printed and attractively set up. Such a book deserves an index, but there is none.

He who would read this story of modern science and the people's health should begin it early of an evening, for if he is like this reviewer, he will not set it down until he has read every word of it. JAMES A. TOBEY

Bacteriology—*A Study of Microörganisms and Their Relation to Human Welfare—By H. W. Conn, Ph.D., and Harold J. Conn, Ph.D. New York Agricultural Experiment Station. (3d ed.) Baltimore: Williams & Wilkins.* 1926. 443 pp. Price, $4.00.

The demand for a third edition of this book shows that it has met with a cordial reception. The chief changes in this edition are in the section on butter making. The book is designed for beginning work in bacteriology, and for students, some of whom may go no further, while others may take up the subject in its agricultural or medical adaptations. The authors believe in the historical treatment and have given a generous amount of space to the history of bacteriology.

The second part, which bears the title "Non-Pathogenic Organisms," includes a chapter on smallpox and other vaccines, diphtheria and other antitoxins, tuberculin and mallein, which seems to us to be entirely out of place. The third part of the book is devoted to pathogenic organisms as they relate to human, animal, plant, poultry and even insect diseases and the application of our knowledge to sanitation. The higher fungi are also considered.

As a whole the book includes much worthwhile, well presented information, and affords a good generalized source of knowledge for the beginning student. The outstanding criticism is

the great number of inaccurate or misleading statements, which do not seem excusable in a third edition. Typical errors are the statement concerning milk from tuberculous cows, that "presumably it is a source of danger to children"; the use of the term "rabies serum"; the definition of "antitoxin unit"; the description of the method of preparation of diphtheria antitoxin; the preparation of bacterial vaccines by making "infusions"; the statement that smallpox vaccine may be considered as "serum therapy" since lymph from the "pustules" is employed; speaking of antirabic vaccine as "weakened cultures," etc. We are told that "a few cases of anthrax in man from shaving brushes have been reported" but "the danger is undoubtedly slight." During the World War among our soldiers, there were 162 cases of anthrax with 27 deaths contracted in this way. The description of the manufacture of diphtheria antitoxin is especially poor, and would lead one to believe that a proper culture may be obtained from any case of diphtheria. The entire description is antiquated and full of inaccuracies.

The discussion of food poisoning is confusing, and the enthusiasm of the author in describing vaccination (typhoid) as protection "from the attack of an invading parasite" by filling the "blood with many millions of the dead bodies of this parasite," seems unwarranted, and shows no proper conception of the principle involved.

There are too many typographical errors. "Tubercular" is used where "tuberculous" is the correct word. The microsporon furfur is given as the cause of "pityriasis," referring to tinea versicolor, for which p. versicolor is a synonym. The cause of the various forms of pityriasis is unknown.

The cuts in the historical section are good but most of the illustrations of bacteria are inexcusably poor. The book is well printed. It is to be regretted that the many inaccuracies necessarily detract so greatly from the usefulness of the book, for the beginner in bacteriology is entitled, as is no one else, to accurate and well presented information. M. P. RAVENEL

Newspapers in Community Service—*By Norman J. Radder. New York: McGraw-Hill Company*, 1926. 269 pp. Price, $3.00.

Ordinarily the ambitious health administrator thinks of the newspaper merely as a convenient channel through which to reach an apathetic public with whatever health facts or ideas he wishes to impress upon them. Norman J. Radder, Associate Professor of Journalism of Indiana University and former staff member of the *New York Times*, believes that the newspaper should itself take the initiative in advancing the interests of the community. While the author has not lost sight of the fact that the main business of a newspaper is to report news, he insists that unless a paper is engaged in "doing things" it is not measuring up to its responsibility. He therefore addresses himself primarily to the editor, encourages him to become an active propagandist and shows him by examples of what others have done, how to act most effectively as the leader of progress. To this end he suggests definite programs suitable for newspaper campaigns, and recites fascinating accounts of a number of notable newspaper crusades such as the exposure of the Tweed ring in New York City. Incidentally, when we read that during the thick of that fight the editor of the *Times* was offered five million dollars to suppress the news, we begin to appreciate the vast power that a crusading newspaper may wield. Equally telling are the narratives of constructive campaigns for civic advancement originated solely by newspapers and carried by them to a successful issue.

But specific suggestions for health promotion campaigns are somewhat meager. There is a vivid account of the *Chicago Tribune's* successful fight for a Sane Fourth, a dramatic description of the exposure of medical diploma frauds initiated by the *St. Louis Star* and briefer mention of a few other health publicity enterprises. Alfred W. McCann's riotous food crusade of 1912 and 1913 waged through the columns of the *New York Globe* is vividly described, but knowing the fallibility of enthusiastic feature writers in matters of scientific medicine, we begin to question if such methods may not, at least in many instances, become a boomerang to the cause of health promotion. We wish the author might have impressed more insistently upon editors the importance of taking the local sanitarians in on their health promotion plans on a partnership basis lest serious mistakes of judgment be made. Appended to the chapter on "Housing and Health" is a list of eleven health projects suitable for promotion by newspapers, and while some of the items are trite and of relatively little value, the list is pregnant with suggestions.

The author's style is direct and clear and a high idealism characterizes the book throughout. Health publicists who appreciate the value of

the newspaper as a powerful weapon as well as a constructive molder of public opinion will find in this book fresh stimulation and a broader, more ambitious conception of the possibilities of the newspaper.

H. E. KLEINSCHMIDT

Scourges of Today—*By E. T. Burke, D.S.O., M.B., Ch.B.(Glas.) with a preface by Dr. R. Veitch Clark, M.A., B.Sc., M.B., Ch.B., D.P.H.* 166 pp.

The Air We Breathe—*By James Kerr, M.A., M.D., D.P.H.* 191 pp.

Diseases of Animals in Relation to Man—*By T. W. M. Cameron, M.A., B.Sc., Ph.D., M.R.C.V.S. London: Faber and Gwyer, Ltd., The Scientific Press,* 1926. 222 pp. Price 3s. 6d. net, each; in America $1.00.

These books belong to the series called "The Modern Health Books" edited by Professor D. Fraser Harris, M.D., several volumes of which have already been reviewed in our columns.

The author of *Scourges of Today* shows a thorough familiarity with the subjects of which he writes and has the faculty of imparting his knowledge in plain and non-technical language. He has apparently fallen under the influence of Sir Arbuthnot Lane, and says positively, as though it has been proved, that "alimentary indiscretion is the stumulus to cancer of the lower digestive tract." He would lead us to believe that daily evacuation of the bowels is the surest protection against cancer of this tract. He advises that a child be taught to say its prayers "before bed" and to evacuate the bowels "after breakfast," as a "firm foundation for both moral character and physical health," which reminds one of a modern philosopher known to the reviewer who is in the habit of saying "to get on well in the world, keep your mouth shut and your bowels open."

The author speaks kindly of the Spahlinger treatment for tuberculosis, and says truly that financing such an effort on the part of wealthy persons would be much better than opening the tombs of the Pharaohs or building airships for flights to the North Pole.

The author of *The Air We Breathe* has given the best popular explanation of the subject of which we know. He has avoided taking as his target persons whose mental age is about 10 years. Beginning with some history, he gives us a clear description of the fundamental laws governing gases which are applicable to the process of ventilation. He discusses the poisonous products of respiration, combustion, the bad effects of body heat, deficient as well as excessive moisture, and gives practical directions for the ventilation of large buildings, dwelling houses, underground railways, etc. This volume will rank as one of the best of the series.

The book, *Diseases of Animals in Relation to Man,* marks a new departure in popular health books. The diseases of animals transmissible to man, both bacterial and parasitic, are well considered. The author's view of the relation of bovine tuberculosis to the human disease is unusual and hard to accept. He approves of the idea that a large amount of tuberculosis in animals corresponds with a small amount in man. In other words he seems to believe that there is some immunizing effect in the prevalence of bovine tuberculosis. He apparently thinks that the complete eradication of tuberculosis from man and animals in Great Britain would be a disadvantage, since the human race would be highly susceptible, and to make the inhabitants safe, the disease would have to be eradicated from the entire world or else communication with other countries cut off. As said above, it is hard to accept such conclusions though the history of the Jewish race gives some support to such an idea, and it is in line with some of our knowledge of acquired immunity.

Another feature of the book which is particularly valuable is the discussion of diseases of animals which carry the same name as human diseases but which are absolutely unrelated, and which cannot be transmitted from animals to man, but concerning which there is much confusion.

The books are of convenient size, well printed on light paper, and can be commended from every point of view.

M. P. RAVENEL

The Theory of the Gene—*By Thomas Hunt Morgan. New Haven: Yale University Press,* 1926. xvi+343 pp., 156 figs. Price, $4.00.

It is a quarter of a century since the rediscovery of Mendel's laws of heredity and the progress made in this period in the analysis of the mechanism of heredity is one of the marvels of biology. No one has contributed more to the precision and to the extension of this knowledge than the author of this book and his collaborators. The Silliman Lectures at Yale

in 1924 covered this field and offer a succinct and critical summary of our present knowledge of the gene and the part it plays in the permutations and changes in the characters of individuals in successive generations. The book opens with a presentation of Mendel's laws of segregation and dominance, followed by concise definitions of linkage, crossing-over, linear order of genes in the chromosomes, and the theory of the gene. Other particulate theories of heredity are then compared with that of the gene which alone rests on the firm basis of a quantitative and statistical study of the observed behavior of characters in controlled breeding. The origins of mutant characters are traced in a striking number and variety of examples to the results of hybridizations and to cytological causes conformable to the gene hypothesis. The notable results which follow the increase by duplication or multiplication of sets of chromosomes are seen in the polyploid series, found in cereals, roses, and chrysanthemums. Different wheats have 14, 28, and 42 chromosomes. Some different chrysanthemums have multiples of 9, up to five-fold or 45. The discussion of sex and genes covers both the insect and the avian types. The data from the study of other types of sex determination, of intersexes and sex-reversals, lends support to the view that sex is determined not by sex chromosomes *per se*, but rather by their proportions and relations to other chromosomes. Lamarckians and others seeking evidence for the inheritance of somatic changes will find little encouragement in this masterly treatise. Workers in the fields of preventive medicine and the social consequences of disease and human deficiencies may, however, find in the stability of the gene a factor of prime significance in all far-sighted preventive work.

CHARLES A. KOFOID

Ohio Public **Health Manual**—*Arranged and edited by James E. Bauman. Ohio State Department of Health,* 1925. 962 pp. Supply limited.

This is the kind of a book which must be reviewed without attempting to read all of it, for it consists of 962 pages, of which 764 comprise the health laws and regulations of the State of Ohio, and 98 the index to them. The index, always a most important adjunct to such a compilation, is well done and is the best part of this particular work. The book is a ponderous affair, about two inches thick and of peculiar shape; instead of the standard book size, the area is about four by six inches. Possibly this is for compactness, though it is difficult to see any advantage in this strange shape, which adds to its obesity.

The laws are arranged by sections in more or less logical order, the sections apparently coinciding with the General Code of the state. At the end of each section are mystic figures in parentheses, which probably mean something and may be entirely intelligible to Ohio health officials, but which are nowhere explained. A foreword clearing up this mystery and explaining other matters would have been valuable.

There are no annotations to the various laws and presumably no statutes that have been held unconstitutional by the courts, if any, have been included. Annotations giving references to court decisions, with the gist of the more important ones, and also the opinions of the attorney general always add much to the usefulness of these compilations of health laws, even if they contribute to the bulk. Cross references, lacking here, are likewise valuable.

Whether the laws and regulations contained in this weighty tome are or are not modern, scientific, practical, effective, and complete for health purposes will have to be determined by someone who has the time and inclination to read them. A mere glance at the book is likely to arouse approval for those who argue that there are too many laws in this country, and sympathy for the lay public whose ignorance of the law is no excuse. Every state should, however, have its health laws available in accurate, up-to-date, well arranged, well-indexed, pamphlet compilation. Of the few which do exist, those of Massachusetts and New York are still the best examples. JAMES A. TOBEY

The Human Body—*By Marie Carmichael Stopes. New York: Putnam,* 1926. 268 pp. Price $2.50.

The dedication of this book explains its purpose. It is intended chiefly for young people who are passing from the stage of childhood into youth, and also for older people who did not receive such instruction as the book contains when they were young. Beginning with the cells as units, it continues in orderly sequence giving the structure and the functions of the various parts of the body and the body as a whole.

As a foundation for the care of the body, a knowledge of its structure and functions is necessary. The writer believes that: "The first step in enthroning the higher intellect in

command as it should be is to acquire some knowledge of the intricate and marvellous communities which unite to form the delicate machinery of man's body."

The book is exceptionally well made. The printing is clear and remarkably free from errors. The illustrations are abundant and above the average, while the colored plates are beautiful. No book of this type has come to our knowledge which we can commend with greater confidence. M. P. RAVENEL

The Rockefeller Foundation Annual Report, 1925—*New York: Rockefeller Foundation.* 521 pp.

World-wide activities in fields of medical and nursing education, disease prevention, hospital development, public health administration, and biological research are revealed in the 1925 report of the Rockefeller Foundation. An impressive map preceding the President's Review shows the distribution of these various activities, while numerous illustrations in the form of photographs, statistical charts and tables add interest to this enlightening report of progress in the promotion of public health.

The scope of work in which the foundation participated during the year may best be indicated by the following from the report:

During 1925 the Rockefeller Foundation in spending $9,113,730 through its departmental agencies, the International Health Board, the China Medical Board, the Division of Medical Education, and the Division of Studies, (1) aided the governments of 18 countries to combat hookworm disease; (2) gave funds to the budgets of organized rural health services in 220 counties in 26 American states and in 18 districts in Brazil, Poland, Czechoslovakia, Austria, and France; (3) took precautionary measures against yellow fever in Salvador, Guatemala, Nicaragua, and Honduras; (4) continued to work with Brazil in freeing its northern coast from this disease; (5) sent a yellow fever commission to the West Coast of Africa; (6) helped to show the possibilities of malaria control in 12 American states and in Brazil, Argentina, and Italy; (7) shared in the development of professional training of public health officers at Harvard University and the University of Toronto and in schools and institutes in London, Copenhagen, Prague, Warsaw, Belgrade, Zagreb, Budapest, Trinidad, and Sao Paulo; (8) contributed to the progress of medical education at Cambridge, Edinburgh, Copenhagen, Brussels, Utrecht, Strasbourg, Beirut, Singapore, Bangkok, Sao Paulo, and Montreal; (9) provided emergency aid in the form of literature and laboratory supplies for 112 medical centers in Europe; (10) maintained a modern medical school and teaching hospital in Peking with 195 students and 87 teachers; (11) aided 2 other medical schools and 19 hospitals in China; (12) helped to improve the teaching of physics, chemistry, and biology in 3 Chinese and 7 foreign institutions in China and in the government university of Siam; (13) supported nurse training courses in Peking Union Medical College, Yale University, Vanderbilt University, and the George Peabody College for Teachers, and contributed to nursing education and service in Brazil, France, Jugoslavia, and Poland; (14) provided current funds for an Institute of Biological Research in the Johns Hopkins University; (15) assisted departments at Yale and Iowa State universities engaged in biological and mental research, and aided the Marine Biological Station at Pacific Grove, California; (16) provided, directly or indirectly, fellowships for 842 men and women from 44 different countries, and financed the travel of 50 other persons either in commissions or as visiting officials and professors; (17) contributed to the League of Nations' international study tours or interchanges for 128 health officers from 58 countries; (18) continued to aid the League's information service on communicable diseases; (19) made surveys of health conditions, medical education, nursing, biology, and anthropology in 35 countries; (20) lent staff members as advisers and made minor gifts to many governments and institutions; (21) assisted mental hygiene projects both in the United States and Canada, demonstrations in dispensary development in New York City, and other undertakings in public health, medical education, and allied fields.

The report emphasizes again that its policy, so far as public health work is concerned, is to work only with and through governments. "Every phase of the program is intended to be a step toward helping society to develop its own governmental functions so that health will be greatly improved and fully protected." As one example of progress, it is noteworthy that the hookworm campaign in Panama has lead to a health department, the law authorizing a national department and adopting a budget of $50,000 for this purpose having become effective in January, 1925. Further studies in Alabama have added evidence to substantiate Dr. H. R. Carter's conclusion that Anopheles quadrimaculatus is the important vector of malaria in Southern United States. A reasonable administrative plan of malaria control is outlined. Perhaps one of the most helpful sections of the report from the standpoint of health officers is that dealing with rural health organization, growth of the movement, cost of rural health units, and the importance of trained personnel. It is significant to note that at the close of 1925, there were 299 full-time county health units in operation in 33 states, and that 80 per cent of them had been established in the preceding six years. I. V. HISCOCK

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

White Plains, N. Y.—The Board of Health of White Plains has issued an excellent report for 1925. The report itself has been carefully prepared, utilizing the outline of the *Appraisal Form for City Health Work* as a basis, while the results achieved during the year are indeed commendable. Photographs of the health department building and numerous graphic illustrations add to the interest and value of the report.

White Plains had an estimated population in 1925 of 27,526. This estimate is based on a careful survey made by the state. About 33 per cent of the births are of foreign parentage. A birth rate of 21.3, a death rate of 11.3, and an infant mortality rate of 49 are recorded.

During the annual survey made by the American Public Health Association and the State Department of Health for 1925, out of a possible score of 1,000 points, White Plains received 927.06. This was the second highest score for cities of New York state, the first being 935.6 received by the city of Syracuse, which has been made a demonstration center by the Milbank Foundation.

The budget of the health department amounts to about 90 cents per capita; that of the Nursing Association, 70 cents per capita; of the Board of Education for health service, 45 cents per capita; of the Department of Charities for the care of contagious disease, acute venereal disease, tuberculosis, and psychopathic cases, about $1.25 per capita.

"The White Plains Hospital and St. Agnes' Hospital are making contributions to the general welfare of the community which it is impossible to estimate in terms of dollars and cents. During 1925, 70 per cent of our babies were born in these hospitals. A hospital is the medical center of a community and makes an invaluable contribution in public health education, in the training of doctors and nurses, and in offering modern facilities for the proper care of the sick and injured."

Canada.—The fourth annual report of the Dominion Bureau of Statistics for 1924 occupies 480 pages, printed in small type. This report includes the statistics of births, deaths and marriages, and is based on data obtained under arrangement with the Registration Departments of Prince Edward Island, Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. The province of Quebec will enter into this arrangement, it is reported, as from January 1, 1926, thus completing the uniform tabulation of vital statistics for all provinces in the Dominion.

The population of the Registration Area of Canada in 1924 was 6,735,000. A crude death rate of 9.8 and a birth rate of 23.4 per 1,000 population were recorded. An infant mortality rate of 78.5 per 1,000 births, as compared with 88.1 in 1923, is noteworthy. For the provinces, the rates ranged from 56.7 in British Columbia to 102.5 in New Brunswick. This report contains an abundance of tables with descriptive text and is a valuable addition to our statistical resources.

Porto Rico.—The 1925 report of the commissioner of health of Porto Rico indicates progress in public health and hospital work. The total population is estimated at 1,398,796, classified as 27.3 per cent urban and 72.7 per cent rural. A birth rate of 39.0; a crude death rate of 22.4; and an infant mortality rate of 148 are recorded. "Perhaps no other work has been given so much attention during this year as the extension of the public health work in the rural communities, which up to the present time has been neglected." It is stated that this work is being supported and strengthened by the unanimous trend of public opinion.

During the period, measles and whooping cough epidemics caused an increased morbidity and mortality rate, particularly among children. The general mortality rate for the year was 22.4. A new division of malaria control has been organized primarily for the purpose of making surveys in the malarial regions of the Island with a view to advise and institute measures of control. Modern and up-to-date municipal hospitals have been constructed in different municipalities. A new leper hospital for 60 patients is being completed. A preventorium for 150 children has also been constructed. A campaign of immunization against diphtheria by means of toxin-antitoxin mixture is well under way.

Under the bureau of social welfare have been established prenatal and baby clinics, with the reorganization of the service of visiting nurses and social service. An educational campaign

has been conducted, through the dispensaries and health centers, on prenatal and child care. A film demonstrating the work of the bureau and its relation to the other private and public agencies has been prepared. A brief summer course for teachers on social problems was organized at the University of Porto Rico.

In the laboratory were made 33,248 examinations during the year, as compared with the following numbers for previous years: 19,004 in 1924, 9,992 in 1923, and 7,067 in 1922. All the examinations are made by physicians who have specialized in their line of work. "The public health laboratory is to-day one of the most potent factors of our new public health organization."

Colombo, Ceylon—The medical officer of health of the municipality of Colombo has rendered an interesting report for 1925 which occupies 55 pages, 8½" x 13" in size. A table of contents occupying the upper half of the first page indicates the scope of the report which is divided into two parts, the first dealing with vital statistics, and the second with administration. Special reports of the microbiologist and the city analyst are annexed. Carefully prepared spot maps showing the location of cases of plague, enteric fever, and phthisis, together with graphs indicating monthly incidence, add materially to the value of the report.

A continued high birth rate for this municipality is noted, 29.9 per 1,000 population in 1925. An estimated population for the mid-year of 256,051 is recorded, of whom 120,180 are Sinhalese, 56,790 are Tamils, and 41,624 are Moors. The crude death rate was 30.2, while the infant mortality rate was 220—"The lowest on record, notwithstanding the unfavorable effect of influenza." The incidence of plague, with 64 cases, was the lowest recorded since the disease appeared in Ceylon in 1914. Cholera, which broke out in the eastern part of the Island, failed to establish itself in Colombo, only 2 cases, the source of which was not definitely traced to India, having occurred, while 4 cases occurred which were definitely traced to India.

During the year additions to the staff of the public health department included a special inspector of insanitary dwellings and a special Assistant Lady Medical Officer of Health to take charge of child welfare work. It is interesting to read under milk control that "in the majority of dairies, the cattle are turned out into the open for a time every day, and thus enjoy an ample exposure to the brilliant tropical sunlight, as incidentally do also the children themselves. There is, therefore, no risk whatever of rickets in Colombo on this account." Registration of dairies is practiced and a circular containing the list of such dairies is prepared for the information of householders. An introductory paragraph to the list reads as follows: "The list overleaf shows all the dairies in Colombo which have been registered up to date this year by the municipality. You are strongly advised, on sanitary grounds, to deal only with such as appear on this list, or who may subsequently be registered." Among other commendable activities of the department may be mentioned the antenatal clinics held weekly at each of the four municipal dispensaries.

BOOKS RECEIVED

RECENT ADVANCES IN PHYSIOLOGY (2d ed.). By C. Lovatt Evans. Philadelphia: Blakiston, 1926. 370 pp. Price, $3.50.

INFANT MORTALITY AND ITS CAUSES. By Robt. M. Woodbury, M.D. Baltimore: Williams and Wilkins, 1926. 204 pp. Price, $3.50.

THE NORMAL CHILD. By B. Sachs, M.D. New York: Hoeber, 1926. 111 pp. Price, $1.50.

THE CARRIER PROBLEM. By K. C. Paul, M.B.B.S. New York: Oxford University Press, 1926. 102 pp. Price, $1.75.

CLINICAL LABORATORY PROCEDURE. By Robt. A. Kilduffe, A.B., A.M., M.D. St. Louis: Mosby, 1926. 287 pp. Price, $3.00.

THE TIRED CHILD. By Max Seham, M.D., and Grete Seham, Ph.D. Philadelphia: Lippincott, 1926. 342 pp. Price, $2.00.

THE HOUSE OF HEALTH SERIES (New Editions)—The Expectant Mother in the House of Health. The Baby in the House of Health. The Runabouts in the House of Health. New York: American Child Health Association, 1926. Price, $.10 each.

CLINICS, HOSPITALS AND HEALTH CENTERS. By Michael M. Davis, Ph.D. New York: Harper, 1927. 546 pp. Price, $5.00.

MAORI SYMBOLISM. Report made by Ettie A. Rout. New York: Harcourt, Brace & Co., 1927. 322 pp. Price, $6.00.

PRACTICE OF PREVENTIVE MEDICINE. (2d ed.) By J. G. Fitzgerald, M.D. St. Louis: Mosby, 1926. 792 pp. Price, $7.50.

SHELL SHOCK AND ITS AFTERMATH. By Norman Fenton, Ph.D. St. Louis: Mosby, 1926. 173 pp. Price, $3.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Serum **Therapy in Tetanus**—Although this paper is written for the purpose of showing the necessity for intraspinal injections of serum in tetanus, it should be read by sanitarians who write, because it is a beautiful example of an effective way to refute the assertions of another to which one cannot subscribe.

ASHHURST, A. P. C. The Prognosis of Tetanus. Jour. A. M. A., 87:25 (Dec. 18), 1926.

Midwifery **Supervision**—After a 7 months' study of nursing and midwifery in England, the author reports upon the supervision of nurses and midwives and suggests that conditions might be improved as they have been in Denmark.

BEARD, MARY. Midwifery in England. Pub. Health Nurse, 18:12 (Dec.), 1926.

Primitive **Rural Nursing**—An appealing story of a nursing service under primitive conditions in the Kentucky mountains, with an unusual record of achievements.

CAFFIN, F., and CAFFIN, C. Experiences of the Nurse-Midwife in the Kentucky Mountains. Nation's Health, 8:12 (Dec.), 1926.

Amebic **Dysentery Carriers**—A plea for the detection of amebic dysentery carriers by means of microscopic examination of stools of persons with hitherto unrecognized symptoms, including constipation, diarrhea, lack of appetite, neuralgic pains, anemia, etc.

CRAIG, C. F. The Symptomatology of Infection with Endameba Histolytica in Carriers. Jour. A. M. A., 88:1 (Jan. 1), 1927.

Foods **as Culture Media**—Meats, fish, vegetables, and puddings infected with organisms of the Salmonella group (listed below) proved to be suitable culture media at ordinary icebox, room, and body temperatures. The author's purpose, in a later paper, is to show that these organisms are infectious and toxin forming. An important contribution to the subject of raw-food handling.

DAMON, S. R., and LEITER, L. W. The Possibility of Human Infection and Intoxication by Certain Organisms of the Salmonella Group 1. Rate and Extent of Growth and Physical Changes Produced in Foods by *Bacillus suipestifer, Bacillus pestiscaviae, Bacillus sanginarium,* and *Bacillus anatum.* Am. J. Hyg., 7:1 (Jan.), 1927.

Botulism **and Tetanus**—Of 62 Maryland soil samples, 6 contained spores of *B. tetani* and 47 contained *B. botulinus* of 1, or combinations of the 3 types.

DAMON, S. R., and PAYABAL, L. B. Distribution of the Spores of *Bacillus botulinus* and *Bacillus tetani* in the Soil. J. Infect. Dis., 39:6 (Dec.), 1926.

Irradiated **Milk**—Irradiated milk fed for 8 weeks to 5 children resulted in an increase in the red cell count of the blood and in general improvement. The benefits were so obvious that the authors propose to carry on further work along the same lines.

DAWKINS, V., and PATTISON, C. L. Irradiated Milk: Its Effect upon the Blood. Lancet, 2:26 (Dec. 25), 1926.

Health Films—As every health officer sooner or later faces the question whether or not to show health films, Mr. Edwards' paper should be widely read. He says, "presenting the facts may interest some, but facts alone are seldom enough to move the public to action." The films should supply the motivating force.

EDWARDS, T. C. Health Pictures and Their Value. Annals Am. Acad. Political and Social Sciences (Nov.), 1926.

Communicable Diseases—The revised report of the Committee on the Control of Communicable Diseases of the American Public Health Association will prove invaluable to all health officials. The causes, modes of transmission, and accepted control measures of the communicable diseases are included in this statement which is approved by the Governing Council of the Association and by the U. S. Public Health Service. A copy should be preserved for ready reference.

EMERSON, H., *et al.* The Control of Communicable Diseases. Pub. Health Rep., 41:51 (Dec. 17), 1927.

Effect of Infant Hygiene—The occasionally expressed conviction that our child hygiene efforts may prove dysgenic is not borne out in this careful statistical study of deaths of infants and children in Chicago from 1900 to 1925. Good ammunition for the proponent of child hygiene.

FALK, I. S. Some Statistical Relations Between Mortality in Infancy and in the Subsequent Years of Life. J. Prev. Med., 1:2 (Nov.), 1926.

Luminous Paints—The contention that the use of luminous paints constitutes an industrial hazard is contradicted by a survey of a majority of the workers engaged in painting dials, in whom were found no evidences of injury.

FLINN, F. B. Radioactive Material An Industrial Hazard? Jour. A. M. A., 87:25 (Dec. 18), 1926.

Deafness in Children—An apparatus is described for testing the acuity of hearing of groups of children, of whom 1 in 20 is reported as having some impairment in one or both ears.

FOWLER and FLETCHER. Three Million Deafened School Children. Jour. A. M. A., 87:23 (Dec. 4), 1926.

Diet and Intestinal Permeability—This is an important contribution to nutrition, for it was found that certain vitamin imbalances facilitated the passage of bacteria through the

guinea pig's intestinal mucosa. If the findings apply equally to human nutrition, they are very significant; hence sanitarians should familiarize themselves with this paper.

GRANT, A. H. Effect of the Calcium, Vitamin C, Vitamin D Ratio in Diet on the Permeability of Intestinal Wall to Bacteria. J. Infect. Dis., 39:6 (Dec.), 1926.

Diet and Rickets—A beautifully controlled demonstration of the diet of expectant mothers indicates that a diet approximately correct in caloric and mineral intake during the last three months of pregnancy is an important influence in controlling the development of rickets in the offspring.

GREENBAUM, J. V., *et al.* Effects of Diet During Pregnancy on Development of Rickets in the Offspring. Jour. A. M. A., 87:24 (Dec. 11), 1926.

Infant Deaths—An analysis of a large number of infant deaths showed the stillbirth and neonatality rates to be doubled in children born of mothers with visual disturbance and edema. Other prenatal conditions affecting infant mortality are discussed in this interesting paper.

FORD, H. W. A Statistical Study on Neonatal Mortality with Special Relation to the Factor of Mother Nativity. Am. J. Hyg., 8:1 (Jan.), 1927.

Irradiation of the Nursing Mother—An account of an experiment leading to the conclusion that ultra-violet irradiation of a nursing mother resulted in the increase of the antirachitic potency of her milk. This observation is of such importance to pediatrics, obstetrics, and dentistry that the method should be given an extensive trial.

HESS, A. F., *et al.* Antirachitic Properties Developed in Human Milk by Irradiating the Mother. Jour. A. M. A., 88:1 (Jan. 1), 1927.

Determination of Lead Poisoning—The importance of lead as an industrial hazard, and the questions arising from the use of tetraethyl lead make the studies of the authors on the amounts of lead excreted by normal persons of particular interest. They find no quantitative expression of lead excretion which is significant in determining lead poisoning.

KEHOE, R. A., *et al.* The Excretion of Lead by Normal Persons. Jour. A. M. A., 87:25 (Dec. 18), 1926.

Non-Official Tuberculosis Programs—The author suggests that case finding, case supervision, and treatment should be in the hands of official agencies, and that the major task of the volunteer organizations is health education.

KIERNAN, FRANK. The Fundamentals in Tuberculosis Work as Understood by Volunteer Organizations. Boston M. & S. J., 195:24 (Dec. 9), 1926.

Malaria Prevention—Experience in Palestine indicates the relative value of measures directed against mosquito larvae, adult mosquitoes, and the treatment of human carriers under the conditions existing in the Holy Land.

KLIGLER, I. J. The Control of Malaria in Palestine by Anti-Anophelene Measures. J. Prev. Med., 1:2 (Nov.), 1926.

School Medical Inspection—This straightforward account of an exceptionally thorough system of annual physical examinations of school children holds up a mark at which most municipalities could aim with profit to public health in general.

LEVINSON, M. P. School Medical Examinations and Health Service. Nation's Health, 8:12 (Dec.), 1926.

Calcium Deficiency—Carefully controlled feeding experiments with gravid rats show clearly the effect of calcium deficiency upon fertility, pregnancy, and lactation. An important contribution to the subject of nutrition.

MACOMBER, DONALD. Effect of a Diet Low in Calcium on Fertility, Pregnancy, and Lactation in the Rat. Jour. A. M. A., 88:1 (Jan. 1), 1927.

Transmission of Typhus—Is the transmission of Brill's disease—the mild form of typhus endemic in Southern United States—accomplished by the louse, as European typhus, or by another agency? Every health official should read the paper not only to find out the author's answer, but because the paper is an excellent example of the way in which to present a scientific conclusion.

MAXCY, K. F. An Epidemiological Study of Endemic Typhus (Brill's Disease) in the Southern United States. Pub. Health Rep., 41:52 (Dec. 24), 1926.

The Bacteriophage Is?—Sanitarians who are interested in the bacteriophage should read this account of the studies which lead the authors to believe with d'Herelle that the phage is a particulate substance—but they question the theory that it is an ultramicroscopic virus.

McKINLEY, E. B., and HOLDEN, M. The Nature of Bacteriophage. J. Infect. Dis., 39:6 (Dec.), 1926.

Goiter Prophylaxis—The arguments for the addition of iodine to the public water supply are summarized in this paper, which tells of the plans for goiter prophylaxis in Minneapolis.

MELLEN, A. F. The Present Status of the Use of Iodides in the Minneapolis Water Supply. J. Am. W. W. Assoc., 16:6 (Dec.), 1926.

Encouraging Breast Feeding—The several mental, anatomic diet and habit factors which influence breast feeding are considered in this excellent statement. This paper should prove valuable to child hygienists.

MOORE, C. U., and DENNIS, H. G. Breast Feeding Problems. Jour. A. M. A., 87:24 (Dec. 11), 1926.

Scarlet Fever Isolation—All of 40 cases of scarlet fever were found to be harboring the scarlatinal streptococcus 3 weeks after the onset of the disease, and of the 6 cultured at 4 weeks all remained positive. This study is of value as an answer to the demand for a shorter isolation period for scarlet fever.

NICHOLLS, E. E. The Persistence of Streptococcus Scarlatinae in the Throat of Convalescent Scarlet Fever Patients. Am. J. Hyg., 8:1 (Jan.), 1927.

Scarlet Fever Vaccination—Out of Russia comes the report of 20 years' experience in the

use of scarlatinal streptococcus vaccine. Two or three doses render the subject immune to the disease, but the treatment is probably too heroic for us if the described reactions cannot be avoided.

NITIKIN, D. V. Streptococcus Vaccine as a Preventive Measure for Scarlet Fever. Jour. A. M. A., 87:20 (Dec. 25), 1926.

School **Clinics for Hearing**—The experience with the hearing tests made in the Minneapolis public schools is described, and a plea is made for the universal adoption of this measure in all schools. The paper fails to go into the details of treatment to be adopted for the partially deaf children, once they are discovered.

NEWSHART, H. Diagnostic School Clinic in the Public Schools as Factor in Conservation of Hearing. Jour. A. M. A., 87:23 (Dec. 4), 1926.

Hookworm **Infestation**—Investigations in Tennessee indicate that hookworm infestation is commonest in regions having a sandy soil. This is the outstanding variable to account for differences in the incidence of the disease.

RICKARD, E. R., and KERR, J. A. The Incidence and Intensity of Hookworm Infestation in the Various Soil Provinces of Tennessee. J. Prev. Med., 1:2 (Nov.), 1926.

Health **Posters**—A list of organizations distributing health posters is appended to a statement of the use of posters, which includes a summary of the findings of the clinic on posters of the Public Health Education Section of the A.P.H.A.

ROBERTS, M. D., and SHORT, B. Posters, Past and Present. Pub. Health Nurse, 18:12 (Dec.), 1926.

Preventing **Maternal Mortality**—This paper presents the need for instructing both physicians and nurses in the preventive measures against maternal mortality, but a plea is made for the greater need of educating the laity.

ROWLAND, J. M. H. Reduction of Mortality and Morbidity in Childbirth. Jour. A. M. A., 87:26 (Dec. 25), 1926.

Heliotherapy—A review of the literature of heliotherapy and actinotherapy, including the effect of light on the blood and metabolism, which should be helpful to the child hygienist.

SCHULTZ, F. W. Heliotherapy and Actinotherapy in Relation to Pediatrics. Am. J. Dis. Child., 32:6 (Dec.), 1926.

Pneumonia **Quarantine**—In the City of Pittsburgh, pneumonia cases are placed under a modified quarantine. The health officer is satisfied from his experience of the value of this measure, which is dictated by common sense, pneumonia being a communicable disease. In Pittsburgh and Washington, where quarantine is enforced, pneumonia has declined; in comparable cities, without quarantine regulations, the rate has gone up during the same period.

VAUX, C. J. **Pneumonia from a Public Health Point of View. Jour. A. M. A., 87:24 (Dec. 11), 1926.**

Rural School Water Supplies—As the condition of rural school water supplies throughout the country is usually far from satisfactory, the record of Connecticut's work to improve conditions there should be worth consideration by other state health authorities.

SCOTT, W. J. A Survey of Connecticut Rural School Water Supplies. Nation's Health, 8:12 (Dec.), 1926.

Cancer Research—The Director of the New York cancer institute tells of the interesting research of the institution in the cause and treatment of cancer. He reports that 20 cases treated with colloidal lead failed to give the favorable results reported by Blair Bell.

SIMPSON, B. T. A Review of Some of the Activities of the State Institute for the Study of Malignant Disease, Buffalo, New York. N. Y. State J. Med., 26:23 (Dec. 1), 1926.

Erysipelas Toxin and Antitoxin—The streptococcus causing erysipelas produces a toxin which provokes the formation of an antitoxin in humans of greater potency than convalescent erysipelas serum.

SINGER, H. A., and KAPLAN, B. Streptococcus Erysipelatis Toxin and Antitoxin. Jour. A. M. A., 87:26 (Dec. 25), 1926.

Dental Deformations—Is mouth breathing, dietary deficiency, or unusual pressure the cause of mal-occlusion of the teeth? The author holds that the last is the most important factor; the discussers of the paper believe the first to be. All agree that the second is of importance, despite the difference of opinion on the other two.

STALLARD, HARVEY. Usual Maxillary Deformations. Jour. A. M. A., 87:25 (Dec. 18), 1926.

Scarlatinal Throat Infections—The same strain of scarlatinal streptococcus may cause typical scarlet fever or sore throat without rash; the latter is infectious, is relieved by scarlatinal antitoxin, and may occur in persons who have had scarlet fever.

STEVENS, F. A., and DOCHEZ, A. R. The Epidemiology of Scarlatinal Throat Infections Sine Exanthemate. Jour. A. M. A., 87:26 (Dec. 25), 1926.

Creamery Supervision—What a creamery operator thinks of health board supervision, and how he thinks it should be done, will be found interesting to administrators.

TAYLOR, G. C. The City Health Officer in Relation to the Local Milk Plant. Nation's Health, 8:12 (Dec.), 1926.

Malaria Transmission—The impounding of water in an Alabama power project gave an excellent opportunity to study the relationship of Anophelene mosquitoes and malaria. The experience indicates that *A. quadrimaculatis*, a pond breeder, is the only malaria mosquito implicated in the particular outbreak of the disease.

SMILLIE, W. G. Studies of an Epidemic of Malaria at the Gantt Impounded Area, Covington County, Alabama. Am. J. Hyg., 7:1 (Jan.), 1927.

PUBLIC HEALTH NOTES

Some Factors in School Health Supervision in a Small Community—School health supervision in Fairfield, Connecticut, is conducted by a physician who also serves as health officer, thereby giving full-time medical service for this town of 15,000 population. During the past six years, the physical examination of school children has been conducted by the same physician, assisted by a nurse who also does follow-up work in the homes. The program has been so arranged that it has been possible to give more individual attention to this work than is sometimes possible in small communities, and this note is consequently offered as being of possible interest to others attempting to carry out a school health program in a small community.

RESULTS OF ANNUAL PHYSICAL EXAMINATIONS OF GROUP OF SCHOOL CHILDREN FOLLOWED OVER A SIX-YEAR PERIOD, FAIRFIELD, CONNECTICUT

Year	No. of Pupils Examined	Defects Found					Defects Remedied by Department, Vision and Adenoids and Tonsils
		Total	Vision	Heart	Adenoids and Tonsils	Teeth	
1919–20	532	321	13	4	195	109	31
1920–21	532	297	8	4	176	109	15
1921–22	532	311	10	4	180	117	13
1922–23	532	307	14	6	199	88	21
1923–24	532	248	12	7	179	50	9
1924–25	532	226	17	8	183	18	10

It has been possible since the fall of 1919 to follow somewhat closely the record of the 3,400 children regularly enrolled in the grade schools. The following table analyzes the results of annual physical examinations of 532 of these children followed for the entire period 1919–25 and shows the total defects found in this group each year. This table also shows the number of defects of vision, for which corrections were secured in the form of glasses, as well as conditions of adenoids and tonsils which were corrected. It will be observed that the total number of defects discovered showed a decrease during the period from 321 on the first examination to 226 on the sixth. There were 199 children with enlarged adenoids and tonsils in the fourth year, which is the largest number showing this defect in any one year, while 183 children were recorded with these defects on the last year of examination. Heart defects showed an increase over the period as did defects of vision. Special efforts are directed to secure treatment of such defects as vision, heart, adenoids, and tonsils, and a separate fund is available for the purpose. One of the most striking features of this table, however, is the decrease in dental defects. It is noteworthy in this connection that there are no special provisions for correction of dental defects except an educational program which provides, among other things, for the sale of toothbrushes at cost and regular classroom inspections. Such dental treatments as were given were by private dentists at the request of parents.

L. E. Poole, M.D., Dr.P.H.

Death of Dr. James R. Bean—Dr. James R. Bean of the Florida State Health Laboratory, died October 27 at Walter Reed Hospital. Burial was at Arlington. Dr. Bean was for several years in charge of the Jefferson County Laboratory of Birmingham, Ala., and at one time directed the work of the City Laboratory at Savannah, Ga. During the World War he spent two years in service, being detailed to overseas service for fifteen months. He was a Fellow of the A.P.H.A.

International Course in Public Health—The Faculty of Medicine of the University of Paris announces a special international course in public health to be given at the Sorbonne with the coöperation of the Health Committee of the League of Nations. Lectures will be given in French "on the major present-day problems of hygiene and preventive medicine, taking account of the work carried on and the results achieved in various countries"; and will include field trips and practical exercises.

Among the lecturers are Drs. Bernard, Calmette, Besredka, Levaditi and Ramon of Paris, Professor Madsen of Copenhagen, Drs. Nuttall, James and Greenwood of England, Dr. Stampar, Director of Health of Jugoslavia, Dr. Saiki of Japan, Professor Funk of Warsaw, Dr. Foramitti of Austria, Drs. Bordet and Gilbert of Belgium, Drs. Rajchman and Carozzi of Geneva, Professor Selskar Gunn of the Rockefeller Foundation, Dr. Rene Sand of the League of Red Cross Societies, and Professor C.-E. A. Winslow of Yale University. Professor Winslow sails for Paris on January 29 and will return about March 1.

Death of Emma Dolfinger—Emma Dolfinger, Director of the Health Education Division, American Child Health Association, died at her home at Forest Hills Gardens, L. I., January 19, 1927, after a long illness. For several years Miss Dolfinger was affiliated with the science department of the schools of Louisville, Kentucky, and at one time she was teacher of biology in the Louisville Normal School. Her national health education work began when she joined the staff of the Child Health Organization. Miss Dolfinger was elected to membership in the A.P.H.A. in 1924. In her death the public health movement suffers a great loss.

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D.P.H.*

Control of Communicable Diseases—The Committee on Standard Regulations for the Control of Communicable Diseases made its report at the Fifty-fifth Annual Meeting of the American Public Health Association at Buffalo, October 11, 1926. This report was approved by the Governing Council of the Association on October 14, and has been officially approved by the U. S. Public Health Service, and appears in *Public Health Reports* for December 17, 1926 (Volume 41, page 2895). The previous report of this same committee will be found in *Public Health Reports* for October 12, 1917 (Volume 32, page 1706).

Four additions have been made to the list of diseases; epidemic (lethargic) encephalitis, influenza, Malta fever, and tularaemia. Cerebrospinal meningitis has been relisted as meningococcus meningitis.

Two new terms have been defined. A "carrier" is a person who, without symptoms of a communicable disease, harbors and disseminates the specific microörganisms. Disinfecting is also defined.

In discussing the individual methods of control of each disease, greater emphasis has been placed upon epidemic measures which occasionally require separate mention.

Special mention will be made in the following paragraphs of the important additions or changes in the committee report.

Anchylostomiasis (Hookworm)—The chief reservoir of infectious material is contaminated soil, and special effort should be directed toward the prevention of contamination of soil and water.

Anthrax—Proven animal cases of the disease should be killed promptly and the carcasses destroyed, preferably by fire.

Chickenpox—The chief public health importance of this disease is that cases thought to be chickenpox in persons over 15 years of age, or at any age during an epidemic of smallpox, are to be investigated to eliminate the possibility of their being smallpox.

Dengue—The incubation period is stated as from 3 to 10 days (previous report is 4 to 5 days). The period of communicability is specified as from the day before onset to the fifth day of the disease.

Diphtheria—It is stated that in 95 per cent of cases the virulent bacilli disappear from the secretions and the lesions in 4 weeks. Where termination by culture is impracticable, cases may be terminated with fair safety as a rule 16 days after onset of the disease. As a general preventive measure the application of the Shick test is recommended for all especially exposed persons, such as nurses and physicians, and active immunization of all susceptibles, but not within 3 weeks after the administration of

* Address all communications relating to this Section to the Associtae Editor at Department of Health, 1300 Beaubien Street, Detroit, Mich.

antitoxin. Active immunization of all children by the end of the first year without prior Schick testing and active immunization of school children with or without prior use of the Schick test is given important mention.

Dysentery—Attention is directed to careful supervision of food and drink. Where the disease is prevalent only cooked food should be used, and such food should be protected against contamination, as by flies and human handling.

Epidemic (Lethargic) Encephalitis—The infectious agent is unknown, but probably found in the discharges from the nose and throat of infected persons or articles freshly soiled. The incubation period, while undetermined, is believed to be about 10 days, and the disease is communicable during the febrile stage. No quarantine is recommended.

German Measles (Rubella)—The incubation period is from 14 to 21 days (old report, 10 to 21 days). No quarantine is recommended.

Glanders—Skin contact with the lesions in the living or dead body is to be scrupulously avoided. It is also recommended that there be semi-annual testing of all horses by a specific reaction where the disease is common. Testing of all horses offered for sale where the disease is common is also recommended.

Influenza—The infectious agent is undetermined, and the source of infection is probably the discharges from the mouth and nose of infected persons, and articles freshly soiled with such discharges. The incubation period is short, usually 24 to 72 hours. Immunization and quarantine are not recommended. Personal cleanliness and hygienic habits are recommended among general measures. The medical inspection of suspicious cases and early isolation are recommended. To minimize the severity of the disease and to reduce mortality, patients should go to bed at the beginning of an attack and not return to work without the approval of their physician.

Leprosy—Where good standards of personal hygiene prevail, this disease is but slightly communicable. Isolation should be for life in a national leprosarium when this is possible, or at least until treatment has brought about a healing of all lesions of skin and mucous membrane, and the patient has been observed without disease in this arrested form for not less than six months.

Malta Fever—The infective organism is the micrococcus melitensis. The source of infection is the milk and urine of infected goats, or other infected domestic animals. The incubation period is from 6 to 16 days. Preventive vaccination has given good results. No quarantine is recommended. Among other general measures of control the sterilization of goat's milk is given much importance.

Measles—The infectious agent is unknown (old report, a filtrable virus). The incubation period is about 10 days (old report, 7 to 18 days; usually 14 days). For immunization there is recommended the use of the serum or whole blood of convalescent measles patients, or of any healthy adults who have had measles, given within 5 days after exposure to a known case of measles. Thus the attack in the exposed person may be averted in a high percentage of cases. If not averted the disease is modified. Given later, but at a time prior to the clinical onset of the disease, convalescent serum usually modifies the severity of the attack, and the patient acquires the usual lasting immunity to the disease. In institutional outbreaks immunization with convalescent serum of all minor inmates who have not had measles is of value in checking the spread of infection and in reducing mortality.

Meningococcus Meningitis—Isolation is recommended for infected persons until 14 days after onset of the disease. Epidemic measures are recommended: increase the separation of individuals, and the ventilation in living and sleeping quarters for such groups of people as are especially exposed to infection because of their occupation or some necessity of living conditions. Bodily fatigue and strain should be minimized for those especially exposed to infection. Carriers should be quarantined until the nasal and pharyngeal secretions are proved by bacteriological examination to be free from the infecting organism.

Mumps—The incubation period is from 12 to 26 days (old report, 14 to 25 days) and the most common period is 18 days (old report, 14 days). There is no quarantine, but exposed susceptible persons should be regularly inspected for the onset, the presence of initial symptoms of the disease, such as fever, or swelling or pain of the parotid or adjacent lymph glands, for three weeks from the date of last exposure.

Poliomyelitis—A newly recognized possible mode of transmission is by drinking milk contaminated by the nose, mouth, and bowel discharges of persons in the active stage of the disease. The incubation period is uncertain because of inexact information as to the period of communicability and essentials for exposure.

but is believed to be from 3 to 10 days, commonly 6 days. Isolation is recommended for recognized cases for 3 weeks from febrile onset.

Rabies—Annual immunization of dogs is recommended where the disease is prevalent.

Rocky Mountain Spotted or Tick Fever—The use of the Spencer-Parker vaccine in infected areas has given generally favorable results, but is still in the experimental stage.

Scarlet Fever—The infectious agent is the *Streptococcus scarlatinae*. The sources of infection are discharges from the nose, throat, ears, abscesses, or wound surfaces, and articles freshly soiled therewith. The nose and throat discharges of carriers may also spread the disease. The period of communicability is 3 weeks (old report, 4 weeks) from the onset of the disease, without regard to the stage or extent of desquamation, and only after all abnormal discharges have ceased, and all open sores or wounds have healed. If medical inspection is not available, isolation for 28 days from onset is recommended. Exposed susceptibles, as determined by the Dick test, may be actively immunized by scarlet fever toxin. In school and institutional outbreak immunization of all exposed children with scarlet fever toxin may be advisable.

Smallpox—The incubation period is from 8 to 16 days (old report, 12 to 14 days). Cases with incubation period of 21 days are reported. There should be isolation of all contacts until vaccinated with virus of full potency. Daily medical observation of all recently vaccinated contacts until height of reaction is passed, if vaccination was performed within 24 hours of first exposure, otherwise, for 16 days from last exposure.

Tetanus—The incubation period is from 4 days to 3 weeks (old report, 6 days to 14 days, usually 9), or longer if latent bacilli deposited in the tissues are stirred to activity by subsequent chemical or mechanical irritation. Commonly 8 to 10 days.

Tularaemia—The infectious agent is *Bacterium tularense*. The sources of infection are wild rabbits and ground squirrels; also infected laboratory animals—infected flies and ticks. The incubation period is from 24 hours to 9 days, average 3 days. No isolation and quarantine are recommended, and there is no immunization.

Typhoid Fever—Release from isolation should be determined by two successive negative cultures of stool and urine specimens collected not less than 24 hours apart. Immunization by vaccination is recommended for communities where the disease is prevalent, and persons who fail to show a strongly positive Widal reaction, and contemplate travelling, should be vaccinated.

Whooping Cough—The incubation period is commonly 7 days, almost uniformly within 10 days (old report, within 14 days). The catarrhal stage occupies from 7 to 14 days. After the characteristic whoop has appeared the communicable period continues certainly for 3 weeks. Even if the spasmodic cough with whooping persists longer than this, it is most unlikely that the infecting organism can be isolated from the discharges. The communicable stage must be considered to extend from 7 days after exposure to an infected individual to 3 weeks after the development of the characteristic whoop. A positive diagnosis may be made by bacteriological examination of laryngeal discharges as early as a week before the development of the characteristic whoop.

The new report of the Control of Communicable Diseases will be published in full in the March JOURNAL *and reprints will be available from the* AMERICAN PUBLIC HEALTH ASSOCIATION.

LABORATORY

C. C. Young

A FERMENTATION FLASK

George E. Thomas
Philadelphia, Pennsylvania

THE fermentation apparatus illustrated in Figure I (patent applied for) was devised to provide an inexpensive and practical one which could be readily cleaned and would occupy a small space in an incubator.

The flask is approximately spherical, has a flat base, an elongated neck and side opening as shown, and contains a tube or gas receiver beveled on one side of the open end which may be calibrated or not as desired. The capacity of the flask to the side opening is approximately 70 c.c. The dimensions of the apparatus are as follows: height 4½", diameter of bulb 2¼", including side neck $2\,^{9}/_{16}$".

When introducing the tube the flask should be inverted, then gradually returned to the upright position leaving the outlet of the tube inclined to the edge of the base of the flask. Held firmly in position with a cotton wad, the tube is inclined to the perpendicular to facilitate emptying and filling it.

The openings are closed with cotton in the usual manner and a stopper may be inserted in the neck of the flash as an additional precaution.

In operation the nutrient medium (about 50 c.c.) containing the sugar is introduced through the side neck. The flask and contents are then sterilized. Before inoculating the media with the material to be examined, the inside tube should be emptied by tilting. The subject under examination is introduced through the side neck and the cotton plug reinserted. When thoroughly mixed with the media the tube is again filled by inclining the flask.

Fig. 1

Fermentation Flask.- Thomas.

The apparatus appears to have all the advantages of devices now in use and it eliminates many disadvantages.

CONVENIENT INEXPENSIVE METHOD OF TAKING BLOOD CULTURES USING KEIDEL TUBES

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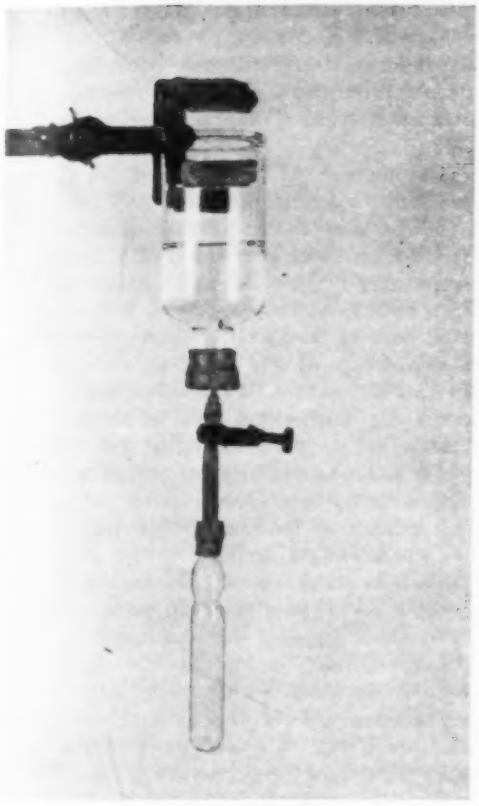
THE FOLLOWING method is simple and inexpensive as it uses ordinary Keidel tube and only involves the extra expense of a Hoffman pinch clamp. In laboratories where only an occasional culture is made, it does away with having two types of Keidel tubes. For use



Keidel Tube with Hoffman Clamp in position showing method of adding media to tube

outside of the laboratory or hospital, it simplifies the amount of apparatus in the kit and conserves the time of the worker. It also permits varying the media as desired without previous tubing.

The various kinds of liquid media desired are placed in rubber capped vaccine bottles and sterilized. Large diphtheria toxin-antitoxin bottles may be used for this purpose.

The method of operation is as follows: After selecting the bottle of media desired, sterilize the cap of the bottle in the usual manner. Place a Hoffman clamp over the Keidel tube as shown, being careful to get it above the end of the capillary glass tube to insure the best operation of the clamp. Screw the clamp down tightly so as to seal the rubber tube. Then break the capillary end of the Keidel tube in the usual manner, having previously inserted the needle through the rubber cap of the media bottle. By loosening the clamp, the media will be drawn into the Keidel tube and the amount may be controlled by the clamp. When the desired amount of media has been drawn into the tube, the clamp is screwed down tight, and the needle withdrawn from the media bottle is wiped with alcohol. Blood is then drawn from a vein with the usual technic, loosening the clamp when in the vein and governing the amount by the use of the clamp. The tube may then be put in the vest pocket to start immediate incubation if desired before the laboratory is reached.

VITAL STATISTICS

LOUIS I. DUBLIN, PH.D.

THE FIRST International Congressof Registrars of Vital Statistics met at Berne, Switzerland, October 28–30, 1926. Registrars were present from Germany, France, Switzerland and the Netherlands in unofficial capacity, not having been delegated by their respective governments. It was decided to form an International Union of Registrars of Vital Statistics and their Assistants (Union Internationale des officieres et fonctionnaires de l'etat civil). Article 3 of the provisional by-laws that were adopted enumerates the objectives of the Union: To perfect the registration laws in the various countries; to simplify and unify registration practices; and to facilitate the exchange of communications between registrars in the different countries. The President is Mr. Bouscholt, Registrar of Rotterdam, the Netherlands.

Appendicitis Record for 1925—An operation for appendicitis has prolonged the lives of a large proportion of the American population for many years. Nevertheless, the death rate from appendicitis is now almost 50 per cent higher than it was 15 years ago. In a table showing the mortality from this disease in American cities, for an aggregate population of

24 millions, the rate of increase was from 13.3 per 100,000 in 1910 to 17.6 in 1925, which is the highest rate on record. Unquestionably improved diagnosis has something to do with the apparent increase in the death rate. There are other reasons for believing that the increase is a true increase due to dietary faults and resulting intestinal infections.

A table showing the appendicitis death rate of 72 cities for the 2 years, 1924–25, indicates a rise in the death rate of these cities from 17.2 per 100,000 in 1924 to 17.5 in 1925. In the case of 30 of these cities, the increase in rate varied widely in extent and proportion. In 1925 the highest appendicitis death rate (43.5) was reported for Passaic, N. J., in contrast to the rate of 15.9 given for that city in 1924. Improved hospital facilities may account for this rise. The next highest rate was 37.7 for Lincoln, Neb., against 35 for the previous year. No death from appendicitis is reported for Newport, R. I., and low rates are given for Bayonne, N. J., 4.5; New Bedford, Mass., 3.3; Milwaukee, Wis., 4.7; and Orange, N. J., 5.7.

The latest detailed statistics from the Census Bureau are for 1923, when the appendicitis death rate for the entire registration area was 14.8 per 100,000. In 1924 the British death rate for this disease was 7.1 per 100,000. The average rate since 1911 has been about 7.0 per 100,000 but in that year the rate was 7.5.

In every year for which the facts are now on record the death rate from appendicitis has been considerably higher for males than for females; 83 per cent of the mortality occurs before the age of 30. The annual toll taken by appendicitis is almost equal to the combined total of intestinal obstruction, gall stones and gastro-duodenal ulcer. Before the age of 45 many more persons die annually from appendicitis than from cancer.—Frederick L. Hoffman, *Spectator*, 117:27–29 (Oct. 28), 1926.

Feebleminded and Epileptics in Institutions, 1923—The total number of special institutions covered by the Bureau of the Census was 139. Of this number 122 were institutions for feebleminded and 17 were institutions for epileptics. In addition there were a few state and 12 federal hospitals that returned schedules for both feebleminded and epileptics.

Institutional care for persons having these mental defects is largely a public matter. Of 51,731 resident feebleminded patients for whom schedules were received, 46,580 or 90 per cent were in state institutions and 2.6 per cent in other public institutions. There were 8,777 epileptics in institutions for epileptics, 4,159 in institutions for feebleminded, 10,016 in institutions for the insane, and 1,066 in almshouses, making a total of 24,018 under institutional care.

The number of feebleminded per 100,000 population increased from 17.5 in 1904 to 39.3 in 1923 due no doubt to increased institutional facilities and more general use of institutions in recent years. The low ratio among foreign-born feebleminded and epileptics is due for the most part to the fact that immigrants having mental defects of this nature are not permitted to enter the country. Provisions made by some states for institutional care of feebleminded women during child-bearing period causes a larger proportion of females than males in the middle age group. Ninety-seven per cent of the inmates of institutions for feebleminded are single and 82 per cent of the inmates of institutions for epileptics. This high percentage is the result of state laws and public sentiment everywhere opposed to marriages of such people. Patients discharged from institutions for feebleminded during 1922, were mostly young persons, 3 out of 4 of them being under 25 years of age. The discharged females averaged older than the discharged males. Of the number of patients discharged from institutions for epileptics, 52.4 per cent of them were under 25 years of age. The average age of females discharged was lower than that of the males discharged.

Of the 42,954 patients in institutions for the feebleminded on January 1, 1923, tabulated with respect to times admitted, 93.3 per cent had been admitted to such institutions but once, 5.2 per cent but twice, and 0.6 per cent 3 times or more. As for patients in institutions for epileptics 81.1 per cent had been admitted but once, 14.9 per cent but twice, and 2.5 per cent 3 times or more.

In institutions for feebleminded, 51 per cent had been in 5 years or more while in institutions for epileptics, somewhat less than half had spent from 2 to 9 years under such care and a little over one-quarter had been in institutions of this type 10 years or more.

The death rate among the feebleminded varies with the degree of mental defect. In 1922 the rates among idiots, imbeciles and morons per 1,000 under treatment were 68.7, 26.7, and 10.1, respectively. Among the patients in institutions for epileptics during 1922, 581 patients died. The death rate per 1,000 under treatment

was 62.6 for males and 50.6 for females. The median age group for each sex at death was 35 to 39 years. This comparatively low age supports the belief that epilepsy greatly shortens life.—Department of Commerce, *Prelim. Bull.*, p. 12, 1923.

Health of the U. S. Army in the World War—In many ways sanitary science has profited as much if not more by the World War than the other departments of human knowledge. A vast number of lessons were learned from the results obtained by hygienic effort during that trying period and if these are profited by, both civil and military public health work will be improved.

Data made public by the War Department indicate that the Army of the United States during the World War reached a maximum of 3,676,133. Leaving out of account those who since 1919 have died of disease or injury of war origin, 114,095 of this group lost their lives, a rate of 310.6 per hundred thousand. Battle injuries accounted for 50,385 of these deaths, non-battle injuries for 5,591 while disease caused 58,119. Five diseases account for more than 87 per cent of these: Influenza, 24,664; pneumonia, 19,167; tuberculosis, 2,766; measles, 2,370, and epidemic cerebrospinal meningitis, 1,836. It is worthy of note that these are sputum-borne diseases. These total 50,803, a trifle more than the deaths from battle injuries. Typhoid and paratyphoid fevers occasioned 238 deaths, Asiatic cholera 7 and dysentery 73, a total of only 318 deaths for fecal-borne infections. This means that sanitary science has triumphed over this group of disease. There were 14 deaths from smallpox, once the scourge of armies, 1 from typhus, a disease that has betrayed military campaigns since time immemorial. There were only 5 deaths from tetanus, thanks to anti-tetanus serum.

Practically 87,000,000 man days were lost by the sick. Injuries account for 24,000,000 or 27 per cent of these days lost. Venereal diseases consumed nearly 7,000,000 man days. The outstanding feature is the terrific loss of military strength occasioned by the sputum-borne and venereal diseases. Both of these diseases require research not only from the laboratory viewpoint but from that of economics, sociology and education as well. The bitter lessons of the war with Spain bore fruit in the war with Germany because the sanitary profession carried them to the people. The same thing can and should be done with the lessons of the World War which were learned at an infinitely greater cost.—*Nation's Health*, 8:688–689 (Oct. 15), 1926.

War, Law and Alcoholism—Special studies were made to show (1) the fluctuations in the death rates from alcoholism in the city of Baltimore, (2) the total deaths from this cause in Massachusetts and (3) the total deaths from this cause in England and Wales. In each case the study was over a period of approximately 75 years.

Deaths from alcoholism in Baltimore and Massachusetts have returned more nearly to the pre-war level than in England, where prohibition does not exist. The domestic facts do not prove that prohibition cannot limit or never has limited the death rate for alcoholism. They suggest that war rather than law has been the important factor in the recent depressions of the death rate from alcoholism in these particular populations.

Aside from the 2 war periods, the most important decline in deaths from alcoholism is that which followed shortly after the Civil War, especially in Massachusetts. This was a period of marked economic depression. Apparently this death rate correlates closely with a decline in business activity. There is also a similarity in the alcoholism death rate in Baltimore plotted against another business index, even though the index refers to the whole nation while the death rates are local.

In questioning the extent of these changes in the death rate from alcoholism as an indication of intemperance as a whole in the population, it is shown that cases of cruelty to children attributed to intemperance have not followed the rising curve of the alcoholism death rate in Massachusetts. On the other hand, the trend of divorces granted for intemperance in this state is not unlike that of the death rate from alcoholism.

A study to show what effect prohibition may have had on the death rate from alcoholism is fraught with many difficulties. Not least among them is the fact that prohibition was not adopted in all states at the same time. For this reason, the study was made beginning at least five years before the war influence made itself felt. Twenty-two states were arranged in four groups, three of which, covering 20 states, showed that the fall of the death rate took place about the same time and in each case before the prohibition law; the last group to

go dry were the first to show the decline in death rates. In fact, the states that adopted prohibition as a state law, all show low and declining death rates from alcoholism as compared with states which became dry by the federal amendment. In the case of the latter, the death rates from alcoholism are almost as high as before the war and they are still on the upgrade.

There is a present tendency for the youth of this country to take up the drink habit. Deaths classified by the Census Bureau show the rise in deaths in the younger age groups is mostly, if not entirely due to an increase in the deaths among women under twenty-five years of age. The 1914 deaths from alcoholism totaled 14, while there were 2 deaths for this cause in 1917. The figures for the 5 following years continued low but there were 23 deaths in 1923 while there were 18 recorded for 1924. J. Roslyn Earp, *The Survey*, 56:581 (Sept. 1), 1926.

Mortality Record of the First Nine Months of 1926—The health record of the Industrial Populations of the United States and Canada for the first 9 months of 1926 although not unsatisfactory, has not been up to the standard of recent years. This is due to the widespread prevalence of influenza and pneumonia during the early months of the year. This situation cleared up, however, and up to the middle of October there seemed to be no particular indications of an autumn recrudescence of influenza or influenzal pneumonia. There has been also a rise in the death rate from organic heart disease, chronic nephritis, measles and whooping cough due to unusual outbreaks of those diseases, and smaller increases in the mortality from cancer and diabetes. These combined increases have not been quite counter-balanced this year by the combined decreases for diphtheria, diarrheal diseases, puerperal conditions and accidents.

The year 1926 promises to register a new minimum in the mortality from typhoid. Scarlet fever also has registered a very low rate in 1926, and the mortality from diphtheria is showing a rapidly falling tendency. The death rate among white industrial policyholders for the first 9 months of 1926 (8.7 per 100,000) is the lowest ever recorded for a like period of any year in the industrial populations of the United States and Canada. The tuberculosis death rate shows a slight decline among the white policyholders, but has increased somewhat this year among the colored. The death rate from puerperal diseases shows an improvement of 8.8 per cent among the whites as compared with the corresponding period of last year and 9.9 per cent of 2 years ago. Corresponding declines among the colored are 7.5 and 10.3 per cent.

There were 433 deaths from alcoholism among Metropolitan industrial policyholders during the first 9 months of 1926. The death rate of 3.3 per 100,000 was the highest for this disease for any similar period since 1917, with an increase of approximately 14 per cent since last year. Cirrhosis of the liver, closely associated with alcoholism, accounted for 863 deaths, giving a rate of 6.6 per 100,000 which is slightly below that for the same months of last year (6.7) and a little higher than for the same period of 1924 (6.3). There were 24 deaths charged to wood and denatured alcoholic poisoning during the 9 months. From the records of the United States Census Bureau it appears that every one of the 35 states for which comparative data are obtainable, registered a higher death rate for alcoholism in 1924 than in 1920. The rate for 1924, for the entire death registration area, was more than treble that for 1920, double that for 1919, and considerable above that for 1918.

Automobile fatalities are recording about the same death rate as last year, which is distinctly encouraging for it shows a check in the rising tendency of the death rate from this type of accident.—*Stat. Bull.*, Metropolitan Life Ins. Co., 7:2–4 (Oct.), 1926.

National Health of England and Wales—According to the seventh annual report of the Ministry of Health, the total number of tuberculosis cases remaining December 31, 1925, was: pulmonary, 249,803, and nonpulmonary, 89,658. Altogether there was an increase of 81,437 cases of which 60,770 were pulmonary tuberculosis. In 1925 the increase of the number of attendances for treatment of venereal diseases was 58,743.

Respecting other infectious diseases, increases were recorded for smallpox, scarlet fever and diphtheria. A decline was shown in the number of cases of epidemic encephalitis but the mortality rate from this disease was much higher than in 1924. In 1925, the number of smallpox cases was 5,354 as compared with 3,797 in 1924. Six deaths were ascribed to smallpox in 1925, as compared with 8 in the previous year. During 1924, the number of births registered

was 703,205; of these 47.5 per cent were successfully vaccinated. The infant mortality in 1925 was 75, the same as in 1924. In 1925, the number of deaths of infants under one year was 53,008 whereas, if the average infant mortality rate of 1891–1900 had been maintained, the number of deaths would have been 108,780, a saving of no fewer than 55,772 infant lives. The 1925 birth rate is the lowest on record.—*Jour. A. M. A.*, 87:1225–1226 (Oct. 9), 1926.

Vital **Statistics for Scotland**—From the second quarterly report for 1926 of the Registrar General for Scotland, the number of births for the quarter totaled 26,996, a gain of 825 over the previous quarter, but 913 less than that recorded for the corresponding quarter of last year. The birth rate of the quarter was 22.1 per 1,000. This is lower than the birth rate of all the second quarters of years since 1855 with the exception of the 3 war years, 1917–1919. The quarterly birth rate for England and Wales was 18.7. As for deaths in this quarter of 1926, there were 17,004 or 924 fewer than in the previous quarter but 1,093 more than in the corresponding quarter of 1925. The quarterly death rate was 13.9 per 1,000. Deaths of children less than one year old numbered 2,158, making an infantile mortality rate of 80 per 1,000 births. In England and Wales, the infantile mortality rate for the quarter was 62.

Of the 17,004 deaths in Scotland in this quarter, 903 were due to epidemic diseases, 370 were attributed to measles, 175 to whooping cough, 111 to diphtheria, 90 to scarlet fever and 151 to diarrhoeal diseases. There were 45 deaths from encephalitis lethargica and 27 from cerebrospinal meningitis. Deaths from influenza numbered 797 as compared with 198 in the corresponding quarter of last year. The number of deaths from tuberculosis was 1,436, 74 more than the previous quarter and 107 less than the second quarter of 1925. Deaths from malignant disease numbered 1,653.

Pneumonia accounted for 1,536 deaths which was 394 more than the corresponding quarter of last year.—*Brit. M. J.*, 2:496–497 (Sept. 11), 1926.

1925 **German Census**—The census of June 16, 1925, shows that the population of the German Reich (exclusive of the Saar region) is 62,348,782, which is distributed over 63,580 communes. No less than 95 per cent of these communes are rural and yet their population is only 22,200,000 or 35.6 per cent of the total population. The 3,448 urban communes have more than 40,000,000 or 64.4 per cent of the population. The large cities have increased their population of 2,000,000 in 1871 to 16,600,000 in 1925. Some peculiar changes have taken place in the distribution of females throughout the cities and provinces. In 1910, there were 1,029 women to 1,000 men, while in 1919 the proportion was 1,101 women to 1,000 men. However, in 1925 a readjustment had begun to set in, for the relation had become 1,068 women to 1,000 men. In Germany to-day there are approximately 30,200,000 men and 32,200,000 women.—*Jour. A. M. A.*, 87: 1574 (Nov. 6), 1926.

London Public Health, 1925—Based on the estimated population of the County of London for 1925, which was 4,612,000, the birth rate was 17.9; the death rate 11.9. The infant mortality rate was 68. The death rate from phthisis was 0.95, from pneumonia 1.04, from bronchitis 0.9 and from cancer 1.44 per 1,000 population.

Since 1895 there has been a steady decline in the birth rate interrupted by the post-war rise in 1920. The contour line for the death rate has steadily declined except for temporary rises in 1915 and the influenza year 1918. The infant mortality rate, unlike the other two, has been permanently below the mean line only since 1905. The average before that date had been well over 150 but the decline since that date to the present figure has been very rapid with the exception of the hot year of 1911. Changes in nomenclature in the classification of causes of death in the age and sex constitution of the population make it difficult to draw conclusions from these contours.

There is better birth supervision of midwives as to care of the eyes of the new-born. About 43 per cent of the total births in London could be accommodated with hospital beds. Since 1915 the undesirable maternity home has disappeared and the standard of efficiency in other homes has improved.—*Lancet*, 2:347–349 (Aug. 14), 1926.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C.E.

Housing Conditions in Relation to Malaria in the United States—This is a summary of some decidedly important investigations now being conducted by Dr. C. P. Coogle, U. S. Public Health Service, in the Mississippi Delta.

For a number of years the plantation and farm owners of the most malarious sections of the United States have had the idea that it is not possible or practical to keep negro farm tenants homes effectively screened at a reasonable cost. Dr. Coogle proves that such is not the case to-day, and that in most instances they can be induced to take better care of the screen of their screened homes than is the case with white farm tenants. In a period of 12 months in 1924 a test of 20 homes with 54 doors and 57 windows was made. Only one of the 111 screen panels was torn and that one was repaired promptly by the colored house tenant. The reasons for this success, as well as of cause of previous failure to keep screening effective, are given. The writer indicates that there is a "right way" as well as a "wrong way" to go about the screening of farm homes, and that going about it the wrong way is to a large extent responsible for the continuous high malaria prevalence rates in rural districts of the United States.

(Abstractor's Note: It is thought that possibly the above will apply to a number of other countries as well as to the United States. The continuation of Dr. Coogle's studies in 1926 gave equally good results on 20 additional farm tenant homes. Nineteen of 20 colored families kept the door and window screens without a rip or defect for a period of 24 months, and yet it is customary not to screen homes of colored farm tenants because "they can not be induced to take proper care of the screen.")—J. A. LePrince, *Pub. Health Bull.*, 156:85, 1925. Abstracted by J. A. LePrince.

Applying Oil Under Pressure as a Mosquito Larvicide—The author describes an economical means of applying oil as a larvicide to the Anopheles producing portions of large impounded water projects. A detailed description of the apparatus he devised, together with illustrations, is given. He stresses the fact that floatage is the most important factor in Anopheles production in newly impounded waters. He thinks more intelligent and reliable labor is needed in applying Paris green in connection with impounded water Anopheles control measures than where oil is used.

With the apparatus described, it was observed that a gentle breeze would carry the mistlike oil spray 200 feet and give a complete oil film on the water surface. The apparatus will spray 25 gallons of oil per hour of continuous spraying. The author gives a description of the successful application of this oil spraying device at a lake near Newton, Alabama, at the new large lake at Muscle Shoals, and at Mitchell Dam Reservoir in Alabama.—T. H. D. Griffitts, *Pub. Health Bull.*, 156:15, 1925. Abstracted by J. A. LePrince.

Larvicides—The author calls attention to improper use and wastage in application of larvicides. He thinks that kerosene or lighter oils used to dilute heavier crude oil (to be used as larvicides) would be just as effective if used in the same quantity without being added to the crude oil. Gasoline is the most strongly larvicidal of all the petroleum products.

For a period of years he has used a motor boat to destroy larvae of A. quadrimaculatus by wave action on a large lake, and the third boat is now being used, 2 others having been used up in this service. The malaria situation at the mine village near the lake made it necessary to close down the mine or solve the malaria problem economically.—C. H. Kibbey, *Pub. Health Bull.*, 156:141, 1925. Abstracted by J. A. LePrince.

Dispersal of Male Anopheles from Breeding-Places—An overlapping of broods of Anopheles occurs in nature, as all the eggs of one female are not laid at one time, and the larvae from one batch of eggs do not develop with the same rapidity. The majority of eggs laid develop into males, which is a provision of nature in order to provide infallibly for the fertilization of the female.

The appearance of the male denotes the presence of water from which it has just emerged, or where egg-laying is going on. The great discrepancy noted in the numbers of males emerging and the numbers found in resting-places may possibly be explained on the basis of food requirements. The finding of males in spring is a sign that new emergences are taking place, as the male does not survive the winter. The earliest record for such males is given as March 14, in the latitude of central Mississippi. The author gives as his impression that the predominance of males is an indication of nearby producing areas, their abundance being in direct ratio to the nearness of a body of water. In midseason the male is seldom found in houses, but frequents woods and streams.

A simple way of determining the efficacy of control measures is suggested in looking for male mosquitoes both before and after such measures have been instituted. If there is a sharp reduction in males the work may be assumed to be progressing satisfactorily.

(Abstractor's Note: In southern Louisiana during 1923, in a rice field region with high Anopheles production, of 2,667 Anopheles mosquitoes bred to maturity in the laboratory from field collection, 1,552 were females, and 1,125 were males. Barber, Komp and Hayne (*Pub. Health Rep.*, 40:3) have shown that the proportions of the sexes of Anopheles found in different resting-places is not dependent on nearness to the breeding-place but on the accessibility of a blood supply. The bloodless shelters (hollow trees, empty houses, etc.) show the largest percentages of males.)—Bruce Mayne, *Pub. Health Bull.*, 156:107, 1925. Abstracted by W. H. W. Komp.

Observations on the Relative Importance of A. Quadrimaculatus, A. Crucians and A. Punctipennis in Transmitting Malaria—The following conclusions are made from the results of various observers: The malaria parasite in one or other of its forms is found naturally in some species and not in others; it is not found constantly in those species which harbor it, though the human index may be constant; although probably all species of Anopheles can be infected with malaria under laboratory conditions, not all become infected to the same degree. With these points in mind, the 3 common Anophelines of the southern United States were examined. A. quadrimaculatus is recognized as being the chief carrier of malaria in the South, and on epidemiological grounds, as well as on the results of dissections of caught imagoes, it seems evident that neither Anopheles crucians nor Anopheles punctipennis are likely to be dangerous natural carriers, although all three species seem to be equally susceptible to infection under laboratory conditions.—Bruce Mayne, *Pub. Health. Bull.*, 156:23, 1925. Abstracted by W. H. W. Komp.

Effect of Temperature on Aquatic Life in Cisterns—These investigations were made to determine practical data relative to stegomyia control in Louisiana. In the United States the wooden "above-ground" rain water cistern is being rapidly replaced by galvanized iron above-ground cisterns. Top minnows live in wooden cisterns and generally keep them free of mosquito larvae, but temperatures of water in metallic cisterns often become too high to support the natural enemies of mosquito larvae. This comparative relation of air and water temperatures is discussed together with effect produced by painting the metallic cistern.—F. R. Shaw, *Pub. Health Bull.*, 156:65, 1925. Abstracted by J. A. LePrince.

Forty-Third Annual Report of the Provincial Board of Health, Ontario, Canada, 1924–1925—*Defects in Existing Ontario Milk Legislation.* Laws of Ontario relating to the production, care and distribution of milk are outlined and discussed, the findings of the Ontario Milk Commission (1909) are summarized, and progress under the Milk Act of 1911, enacted to remedy the defect emphasized by the Milk Commission, is reviewed. It is pointed out that only the larger cities have exercised to advantage the powers conferred by the legislature.—A. E. Berry, p. 115. Abstracted by R. E. Thompson.

Activities of the Experimental Station for 1924. The work of the Experimental station during the year is reviewed and researches carried out and in progress are briefly outlined. An investigation of the treatment of the water supply of Burks Falls was conducted during the year. The supply is derived from Reazin Lake, and is soft and highly colored. Large amounts of alum are required to appreciably affect the color, and subsequent chemical treatment must be employed to correct the corrosiveness of the coagulated water. Laboratory tests with sodium aluminate were fairly successful in highly-acid waters, but few waters were found which were sufficiently acid to completely pre-

cipitate the amount required for efficient filtration. It was found that when solutions of alum and soda ash of certain strength were added together the first precipitate of aluminum hydrate was redissolved, and that when the resulting solution was added to water an aluminum hydrate floc was obtained immediately. Laboratory experiments on coagulation of a number of different types of waters by this method have given excellent results and it is proposed to apply it on a practical scale on the troublesome supply of Burks Falls. If successful, the advantages of this treatment for waters of low alkalinity are obvious.—A. V. DeLaPorte, p. 112. Abstracted by R. E. Thompson.

Engineering. Developments in water treatment and sanitation in the province since the office of Provincial Sanitary Engineer was created in 1913 are reviewed briefly. Prior to 1913 there were 7 water purification systems in operation in Ontario, while at the present there are 41 purification plants and 96 chlorination installations. The annual water works expenditures in the cities of the province have increased from $183,689 in 1916 to $4,594,274 in 1924. The typhoid death rate for the towns and cities during 1924 was 2.5 per 100,000 population, the lowest in the history of the province. In 1910 the rate was 31.5.—F. A. Dallyn, p. 99.

The Relation of Sanitary Engineering to Public Health—This popular article contrasts sanitation with living conditions as they were a generation or so ago and as they are to-day with particular reference to the improvements made in those lines of work under the direction of engineering bureaus. The writer concludes with this statement: "It is quite evident, therefore, that sanitary engineering plays a most important part in the health of the people, and that modern living conditions could not be maintained without the help of the sanitary engineers."—Chas. F. Mebus, Pa. State Health Dept., *Listening Post*, 3:7 (Dec.), 1925.

The Typhoid Carrier Problem—The writer describes the importance of having an epidemiological study of all known cases of typhoid fever and paratyphoid. The Widal test for differentiating between carriers and normal individuals is faulty and is relied upon too much by physicians and sanitarians. Typhoid carriers can be detected among convalescent cases by requiring that 2 negative cultures of both stools and urine be taken at intervals not less than 1 week apart. Regulation 34a of the New Jersey State Department of Health providing for keeping typhoid patients under observation until discharges are free from typhoid bacilli is quoted and the importance of all local health departments enforcing it discussed. Certain restrictions which provide for the protection of the general public are set forth as necessary in the supervision of typhoid carriers.—Henry B. Costill, N. J. State Dept. of Health, *Pub. Health News*, 11:51 (Jan., Feb.), 1926. Abstracted by E. S. Tisdale.

Milk and Pasteurization—This article treats at length the various sources of contamination in milk, and presents pasteurization as the only feasible method for safeguarding the milk supply. The physical, chemical, biochemical and bacteriological effects of pasteurization are given, and also statistics indicating a reduction in the death rate from diarrhea and in infant mortality in New York City since it was introduced. The author urges pasteurization because it destroys tubercle bacilli and other pathogens, and because a pure, safe, continuous supply of raw milk cannot be produced. —H. Whitehead, *J. Roy. San. Inst.*, 46:247 (Nov.), 1925. Abstracted by D. E. Kepner.

The Uniform System of Milk Inspection—Success in carrying out programs of uniform milk inspection has suffered most in the past from the many opinions expressed and the variety of methods suggested for dealing with so complicated a question. Many advisers have not considered that there is a commercial problem as well as a sanitary problem. The real improvement must come from within the trade itself.

On many farms the buildings are dark, poorly ventilated and overcrowded. Under these conditions, it is impossible to produce clean milk or to prevent disease. These conditions should be improved, but action should not be too drastic due to limited financial resources. A careful survey should be made and all necessary improvements recorded and a plan devised for a gradual process of reconstruction to extend over a period of 10 years, so that at the end of that period all cowsheds will be reconstructed.

All producers should be licensed, and a license refused on those farms where reasonably clean milk cannot be produced until improvements have been made. All farms should be classified into 3 groups, such as Grade A, Grade B and Grade C. The grade qualifications are given

Tuberculous infection in milk must be prevented from reaching the consumer and pasteurization is used only as an expedient. In each county a whole-time supervising officer (a veterinarian) should be appointed and the inspection work carried out by veterinary practitioners acting under his supervision. Milk distribution should be confined to bottles, and only those distributors should be licensed who are provided with proper buildings and apparatus for cleaning and sterilizing bottles.—J. W. Brittlebank, *J. Roy. San. Inst.*, 46:372 (Jan.), 1926. Abstracted by J. F. Miller.

Progress in the Purification of Water Supplies—Progress in water purification during 1925 is reviewed, the phases of the subject dealt with being double filtration, slow sand and rapid sand filtration, sedimentation and coagulation, algae growths, pipe incrustation, softening, ultra-violet ray treatment, sodium iodide treatment and goiter, water standards, *B. coli* test, and removal of taste from chlorinated waters. Superchlorination and dechlorination have recently been experimented with at Toronto as a means of correcting the latter difficulty and this process will be tried on a large scale in the near future. Employment of double filtration to cope with the ever increasing pollution is extending.—Norman J. Howard. *Contract Record*, 39:133 (Dec. 30), 1925. Abstracted by R. E. Thompson.

The Installation of Ponds for Propagating Gambusia at Impounded Water Projects—A brief reference to the beneficial results to be gained through the presence of large numbers of Gambusia in impounded waters is made. Then the problem of obtaining Gambusia in abundance is discussed. The only sure way to get them in most localities is to propagate them. In some localities old ponds can be used as they exist. It is, however, often necessary to destroy predatory fish before Gambusia can be grown in large numbers in such ponds. Where old ponds are not available, it is necessary to build new ones. Naturally swampy areas and areas below springs are generally the most desirable places for locating the ponds, for in such areas the ponds seldom go dry and aquatic plants and small animals, constituting protection and food for the fish, ordinarily already are present or quickly become established. Where swampy areas and springs do not exist ponds may be built in or adjacent to streams.

The fish ponds may be built on the area to be flooded, causing the fish to be liberated in the new lake as the water rises, or they may be built in suitable areas near the lake. In any event, it is regarded as desirable to have one or more fish ponds adjacent to the lake from which a supply of fish may be obtained, if needed, after flooding has been completed.

Artificial feeding of the brood stock and young fish on alternate days with finely chopped meat or fish or with bread, generally stimulates reproduction and makes for rapid growth and is an aid in propagating large numbers of Gambusia in ponds.—S. F. Hildebrand, *Pub. Health Bull.*, 156:98, 1925. Abstracted by S. F. Hildebrand.

Preliminary Treatment of Sewage as Affecting Rates on Trickling Filters—The writer discusses preliminary treatment of sewage by grit chambers, coarse and fine screens, sedimentation, septic tanks, chemical precipitation, and activated sludge process prior and accessory to trickling filter treatment.

It is stated that grit chambers and screens are deficient in removal of suspended solids as compared with sedimentation; that in the case of septic tanks the fact of objectionable odor and possibility of scum being present in the effluent make their use of doubtful efficiency. While chemical precipitation is highly efficient it is thought that the increase in allowable filtration rate is more than offset by the additional cost of this treatment.

While the success of the activated sludge process prior to the trickling filter at Birmingham, England, is mentioned, the author states "it does not follow from the Birmingham experience that the activated sludge process can be profitably employed for preliminary treatment of the relatively weak sewage of this country."

The conclusion is reached that in the majority of cases in this country efficient sedimentation will be the most economical preliminary treatment before trickling filters at municipal sewage treatment plants handling the usual sewage and wastes.—Almon L. Fales, *Am. City*, 34:270 (Mar.), 1926. Abstracted by H. N. Old.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M.D.*

Prohibition or Regulation—The question of whether certain hazards to the health of workers shall be controlled by prohibiting the exposure altogether or by regulation under efficient supervision is gradually facing the field of industrial hygiene. Already there are some who firmly believe and are advocating that certain poisonous substances be prohibited entirely in certain industries, for instance, lead in paint. This movement is arising largely on the Continent and it is but natural that Great Britain should be a step or two ahead of us in America in considering the problem. The *Lancet*, Nov. 27, 1926, contains two articles dealing with the subject and a very interesting editorial which we reprint in full below.

The two articles are entitled respectively "The Mechanism and Incidence of Industrial Lead Poisoning," and "The Lead Paint Poisoning Bill" in the House of Lords. Upon the date of Thursday, Nov. 18, 1926, an attempt to modify the Government's bill by a clause which would prohibit the use of lead paint in painting the interior of buildings, after much discussion on both sides, was negatived by a vote of 45 to 23. A second movement or clause to prohibit the employment of women and young persons in painting buildings with lead paint, also after much discussion pro and con, was finally negatived by a vote of 35 to 17. The editorial, we think, comprehensively reviews the whole question and is in some respects a summary of the general subject of lead poisoning:

"The Lead Paint (Protection against Poisoning) Bill has been debated as though the choice lay between regulating the use of lead paint and prohibiting it altogether. Prohibition is a policy unlikely to be adopted by the present Parliament without prolonged controversy. The choice may, therefore, be otherwise stated; it lies between obtaining regulation before Christmas and obtaining no legislation on the subject at all for some time. It has been said that the prohibition of lead paint in this country would reduce painting work by 40 per cent, and the Government is naturally loath to disturb industry or to increase unemployment unless it is absolutely necessary. It undertakes, however, to bring in a bill to prohibit lead paint if the proposed regulations fail to give the protection now hoped for, meanwhile asking that the regulations be given a trial. The bill gives some idea of the scope of these regulations. They may, where buildings are being painted, prohibit the use of any lead compound except in the form of paste or paint ready for use; they may prohibit dry rubbing down and scraping; they may deal with the danger of applying lead paint in the form of spray; they may provide for periodical medical examination and for the non-employment of persons whose health appears likely to suffer; they may secure washing facilities for painters both during and after work; and they may provide for protective clothing and the distribution of instructions as to the hygienic precautions to be taken. Finally, Clause 2 of the bill, following the Geneva Convention, prohibits the employment of women and children in the painting of any part of a building with lead paint, on the grounds that in the case of women there is a greater susceptibility to lead poisoning, more rapid intoxication, and graver racial consequences. Politically the exclusion of women is resented by the advocates of sex equality, though similar exclusions have been upon out statute book for 35 years and though two fresh instances were enacted in 1920 without evoking much protest.

"The other opposition to the bill comes partly from those who do not wish to see any further interference with industry by Government departments, but mainly from those who will not accept mere regulation of an industrial risk which, they say, should be altogether abolished. They demand the prohibition agreed upon by the Geneva Convention and will not accept the half-loaf now offered. Mere regulation, they consider, can never safeguard the

* The editor of this Section will gladly receive contributions from members. Please address all communications to State Department of Health, Columbus, O.

ordinary house painter who works in private dwellings either by himself or in small groups and thus cannot be subject to adequate official inspection. Britain, they say, agreed to prohibition at Geneva and she must not dishonour her signature; the country which has led the world in welfare legislation must not turn reactionary now. The defenders of the bill reply that there was no signature to dishonour, and that this country in no way bound itself to any course of action; they believe that regulation can make the industry reasonably safe. Trade unions will tell their members of the risks and the prescribed precautions, and medical examination will play its part in detecting the onset of disease. Medical science is thus expected to answer two main questions: 'Can any—and, if so, what—regulations sufficiently protect the lead paint worker?' and 'Have women a special susceptibility to lead?' In another column (p. 1132) we summarise some of the evidence on these two questions.

"Some industries have had experience of the value or otherwise of regulations, though the statistics as to lead poisoning in the potteries are being freely used by both sides. According to British experience, white lead manufacture, work in potteries, and metal smelting seem to carry a graver risk of plumbism than painting, and it appears that in any lead trade the chief danger is from dust or fumes. Many authorities, especially in this country, consider that lead enters the system chiefly through the respiratory tract. Others regard the digestive tract as the principal channel of entry, and it has been stated that experiment shows that whereas only 12 per cent of lead dust enters the lungs, about 70 per cent enters the digestive tract after settling in the mouth or nose. 'Whatever be the truth,' as the International Labour Office says, 'this discussion, from the practical point of view, is of only secondary importance, the campaign being really waged against the great enemy, dust.'

"How, then, does lead affect workers in paint? The painter using paint already mixed incurs only the slight risk of ingesting small amounts of lead—*e.g.*, from his paint-smeared fingers. But if he uses sandpaper on painted surfaces by the dry process, he inhales large quantities of dust. The regulations prohibit this dry process, and their supporters expect much from this provision. The bill does not, however, specifically guard against the inhalation of lead oxides, when the workman burns off paint with a blow-pipe, which is regrettable since inhalation of small amounts of insoluble lead compounds may be very dangerous. It is, indeed, a characteristic of lead that it acts in very small doses. The amount required to set up chronic plumbism has been estimated as low as 1 mg. of dust inhaled daily, and 10 mg. sets up severe symptoms in a short time, though there is reason to think that animals and human beings may acquire a tolerance under certain conditions.

"American and German research shows that lead compounds, inhaled and ingested, are stored as an insoluble phosphate in the skeleton. This may be gradually mobilised and excreted, and in passing through the blood stream may produce toxic symptoms. Detailed analyses of human tissues have proved that workers in dusty lead trades may have from 0.5 to 1.0 g. of lead phosphate in the skeleton.

"In the course of a speech against the bill in the House of Lords on Nov. 18, Lord Dawson referred to the use which could be made in industry of a biochemical test for the susceptibility of individuals to lead and the degree of poisoning reached, and there is no doubt that if so dangerous a substance as lead is to be employed at all the workers ought to be frequently and carefully examined, not merely for crude paralyses but for slight deviations from health. The Government describes its proposals as an experiment, and it is an experiment that will only succeed if employees are kept under thoroughly efficient medical supervision. The Government's opponents describe the experiment as gambling with men's lives, but as we have pointed out, the choice at present appears to be between the regulation and nothing, and it is gambling with lives to leave things as they stand.

"The Government has given its pledge to introduce prohibitive legislation, if the present regulations fail, and in the meantime it would be well to accept substantially what is offered. It is regrettable that the system of control rather than prohibition will involve further inspection and State interference with an industry, but an element of compulsion does not necessarily exclude the education which is the only satisfactory basis of industrial hygiene. Education should be all that is needed, for it is to the interest of everybody—employer and employee—that poisoning should not occur. The continued existence of the problem, however, seems to show that education requires temporary reinforcement.

"The attempt to prevent women from working with lead paint has given rise to much con-

troversy. The argument that women (or men) can be left to look after themselves is unconvincing; if it were accepted it would mean that the State should never introduce legislation governing the conduct of factories; it ignores the unpleasant fact that many workers in this country today are forced by circumstances into certain forms of employment whether injurious or not. The Government's proposal to exclude women suggests a lack of faith in the new regulations as a safeguard against lead poisoning. Granted that a considerable risk is still being run the exclusion is based on (1) the higher susceptibility of women, (2) the graver effects of poisoning in women, and (3) the danger of lead producing abortion or the early death of children. Evidence on each of these questions will be found in the special article referred to. There is no doubt that the older statistics on lead poisoning in women are largely fallacious because women were given the most dangerous jobs in the industry and were badly paid and underfed. The International Labour Office states that 'while English opinion inclines to the view that women are more susceptible to the action of lead than men this is not accepted by German writers who consider that their poor state of nutrition, poverty, industrial fatigue, added to housework, long hair, and type of clothing favouring the accumulation of a greater quantity of the poison upon them, are sufficiently potent factors to account for the apparent disparity. Data from the United States are not sufficient to allow the experts to support either of these views. All, however, agree that in women lead poisoning assumes a more severe form . . . than in men.' This is a very important fact; but when supporters of exclusion speak of the effect of lead on female fertility they are certainly not on sure ground, for chronic poisoning of the father appears to be almost as damaging to the ovum as chronic poisoning of the mother. Lord Haldane will have sympathy for his plea for further medical guidance on this question before rash assumptions are made. The general admission that lead poisoning does more damage, when it affects the female, is a sufficient ground, perhaps, for excluding women from the industry as at present conducted, but the new regulations will be a failure unless they make the work reasonably safe both for men and women."

Lead Poisoning in the Potteries—"Mr. Rhys Davies asked the Home Secretary whether his attention had been called to three serious cases of lead poisoning in one factory in the potteries during 1926 affecting young women aged 19, 23, and 24 respectively, one proving fatal; and what steps he proposed taking with regard to the use of lead in this factory in future.

"Sir William Joynson-Hicks replied: 'The three cases referred to occurred in a factory in which until this year no case of lead poisoning had been reported since 1913, about which time the factory was reconstructed; but it appears that recently the system of exhaust ventilation has not been maintained in an efficient state, and the matter has been actively taken up by my Department.'"—*Lancet*, 1090 (Nov. 20), 1926.

The Five-Day Week for Office Workers—"The International Brotherhood of Painters and Decorators has about 35,000 members working the 5-day week out of approximately 125,000. Not in a single instance where it has become effective, is the employer desirous of again returning to the 5 and one-half day week. If the work of the world can be done in 5 days—why work 6? It was at first contended, when the 8-hour day was inaugurated, that we were 25 years ahead of the times, but had we waited 25 years, we would still be waiting for the 8-hour day. The 5-day week was adopted by our Brotherhood because, largely, the ingredients we are forced to use in our trade are dangerous to the health of our members, and the 5-day week, wherever adopted, has improved the health of our members wonderfully since it gives them 2 days' time in which to throw off the poisonous substances which they inhale during the period engaged in their occupation. In addition to this, it provides more work for our members and in every other way has been beneficial.

Recently, a very prominent business man maintained that the 5-day week would never work in offices, and he inquired if we practiced it in our general office and I was forced to admit that we had not been doing so. Untold thousands of men and women have been forced to abandon office work by reason of the continuous physical strain and take up some other vocation. Thus the services of many valuable employes have been lost and there is an expensive turnover of workers.

In view of the foregoing, after the adoption of the resolution in which the American Federation of Labor endorsed the 5-day week, we put it in operation in our own establishment, and I am pleased to say that we adopted it

without any friction as our entire force cheerfully agreed to get out all of their work in 40 hours. Hereafter, our general headquarters at Lafayette, Ind., which are located in the finest and most artistic labor building in the world, will be closed all day Saturday to prove conclusively that the 5-day week can be adhered to in almost any occupation. If successful business concerns employing thousands of workers can close their doors during the summer months every Saturday, it would in no way hinder their business to close them every Saturday during the year."—George F. Hedrick, General President, Brotherhood of Painters, Decorators, etc., *Painter and Decorator*, 40:11, 4 (Nov.), 1926.

Industrial Fatigue Following Unemployment—Unemployment has been exceptionally prevalent in Sheffield during the past 5 years. At some periods the number of unemployed has been approximately 50,000, or practically 10 per cent of the population, and it has seldom fallen much below 30,000. Professor F. E. Wynne, M.O.H., reports that this has involved much poverty and hardship, but that at the same time there has been a steady decline in the death rate as well as the absence of any great epidemic, and these conditions have not been associated with any serious deterioration in the public health. This is attributed to the fact that grievous hardship is eliminated under modern conditions as through unemployment insurance, poor law relief and various welfare measures. Also the effect on those normally employed under more or less unhealthy conditions must be for the time being beneficial to their health; likewise the enforced reduction in the consumption of alcohol, and a restricted and more carefully chosen diet, may all make for improved health. Still this is at far too high a cost. Prolonged unemployment gets a man out of training for his job, and engenders a mental state in which the effort to return to a routine of hard daily work becomes intolerable. A general resumption of employment in the immediate future would mean an unheard of loss of time and wages as the result of "industrial fatigue" among men who had got "out of training."—*Med. Officer*, 954:220 (Nov. 6), 1926.

FOOD AND DRUGS

WALTER S. FRISBIE

Cocoa and Chocolate as Sources of Protein in the Diet—The authors, finding no record in the literature relating to the biological value of the nitrogen of chocolate and cocoa, undertook to conduct experiments with rats in which the ration supplied practically all of the nitrogen in ether-extracted cocoa powder or in a definite mixture of skimmed milk powder and ether-extracted cocoa powder and so designed as to obtain information on the biological value of the absorbed nitrogen as well as the digestibility of the nitrogen consumed. Experiments were performed on 30 rats, and tables show the nitrogen metabolism for the various rations as well as summary of the coefficients of digestibility and biological values of the nitrogen of cocoa in fifteen individual experiments. When fed at a level of approximately 8 per cent crude protein, cocoa nitrogen was found to have an average digestibility coefficient of 38 and the absorbed nitrogen an average biological value of 37. The average true digestibility of a 1:1 mixture of milk and cocoa nitrogen fed at the same level was found to be 63. The estimated digestibility of such a mixture would be 69, assuming the true digestibility of milk nitrogen to be 100. This 1:1 mixture of milk and cocoa gave an average biological value of 70. Assuming for milk an average biological value of 85, the estimated biological value of the cocoa nitrogen is 31 which checks very closely with the value determined, that is, 37. The conclusion is reached that no marked supplementary relation exists between the nitrogenous compounds of milk and cocoa based on the check between estimated and determined biological value for cocoa. Cocoa containing an average of 21.5 per cent crude protein would, therefore, contain 8.2 per cent digestible crude protein and only 3 per cent of protein available for replenishing the protein content of the animal. Therefore, cocoa is classed as an unimportant protein food and the obvious conclusion is that chocolate is proportionately

less important from that standpoint.—H. H. Mitchell, Jessie R. Beadles, and N. Helen Keith, *J. Biol Chem.*, 71:15 (Dec.), 1926.

Bacteriological Study of Canned Salmon—This paper reports the examination, over a 5-year period, of 7,664 cans of salmon, experiments comprising 540 separate lots. Of the total, 4.6 per cent were found non-sterile. The samples were classed in two grades—normal and doubtful, excluding swells and leaky cans. In 5,276 cans of sound, normal salmon 3.4 per cent were non-sterile, and in 2,398 cans of doubtful quality 7 per cent were non-sterile, with 0.9 per cent in the former and 1.6 per cent in the latter rejected on bacteriological grounds. From 220 non-sterile cans of salmon 81 per cent contained sporulating aerobes; 7.3 per cent non-sporulating rods; 7.3 per cent cocci; 2.2 per cent obligate anaerobes; 2.7 per cent true thermophiles; and 0.4 per cent molds. Seventy per cent of the cans containing aerobes showed less than 10 bacteria per gram. *B. mesentericus Flugge* was most frequently encountered, with 73 isolations; and *B. vulgatus Flugge*, 49; *B. subtilis Cohn*, 31; and *Bacillus cereus Frankland*, 19. Eight other species in lesser numbers were identified as well as 17 micrococci, 8 sarcinae and 1 streptococcus. The 16 non-sporulating bacilli were a varied lot with few common characteristics including a number of common water bacteria but no member of the Salmonella group was found. Only 7 obligate anaerobes were found. Obligate thermophiles were found five times. Yeasts, molds and actinomyces were rare in some canned salmon. Canned salmon inoculated with sporulating aerobes shows a growth without the production of gas or marked spoilage, the results being the softening of the flesh, abnormal odor and frequent discoloration. *B. botulinum* grew vigorously in canned salmon at low temperatures with gas formation, putrefaction and liquefaction. This organism has not been found in commercially canned salmon and the product has not been assigned as a cause of botulism.—Carl R. Fellers, *J. Bact.*, 12:181 (Sept.), 1926.

Growth-Promoting Property of Irradiated Fat in the Diet, of Direct Irradiation, and of Cod Liver Oil—The observation is made that previous investigators have shown that while the growth of young rats on a diet deficient only in vitamins A and D is stimulated by daily irradiation, this light cannot replace the fat-soluble, growth-promoting factors in the diet. Attempts were made by two methods to compare the growth-promoting power of irradiated fat in the diet, of direct irradiation, and of cod liver oil. Rats on a diet deficient in vitamins A and D after a failure to gain further weight for a period of three weeks were exposed daily to light from a mercury vapor quartz lamp or given irradiated fat in the diet, and resumed moderate gain in weight for a period of 2 to 4 weeks, the maximum gains being of the same order in both groups but much less than those of another group which received cod liver oil. Rats fed from the beginning a diet deficient in vitamins A and D and in addition either directly irradiated or given a vitamin-deficient diet which contained irradiated cottonseed oil, attained weights greater than rats on an exclusive diet deficient in vitamins A and D but not so great a weight as rats on this diet supplemented daily with 150 mg. of cod liver oil. It is concluded that irradiated fat in the diet and direct irradiation of the animal have the same power to promote gain in weight for rats on an A and D vitamin-deficient diet but that this power is less than that of cod liver oil owing to the fact that it contains vitamins A and D possessing growth-promoting power in greater degree than either direct irradiation or irradiated oil. Irradiated oil in the diet can be used as a substitute for direct irradiation of animals but cannot act as a complete substitute for cod liver oil unless fat-solube A is also administered. Radiant energy, supplied directly or indirectly, enhances growth but does not prolong the life and prevent xerophthalmia in rats on a diet deficient in vitamins A and D.—H. Goldblatt and Alan R. Moritz, *J. Biol. Chem.*, 71:127 (Dec.), 1926.

Fatal Poisoning by Sodium Nitrite—Four fatal cases resulted from taking purgative lemonade which contained sodium nitrite instead of sodium tartrate. Alkaline nitrites are not included in the French Codex and are not on the dangerous drugs list. Even if the presence of nitrites were established, it might be difficult to prove that they had been taken, since nitrites are readily formed from nitrates in the presence of organic matter. The observed symptoms of poisoning were, nausea, vomiting, collapse, and death in a few minutes. In one case the body was reported to show a black symptom. Nitrites transform oxyhemoglobin into methemoglobin, and have a depressing influence on the nervous system. In the case under consideration each bottle of purgative

lemonade contained 23 to 26 gms. of sodium nitrite. Nitrite was detected by various reactions including formation of an intense blue coloration in the presence of potassium iodide and starch; a green coloration with an acetic acid solution of antipyrin; an orange coloration with the Deniges' aniline reagent in acetic acid; and by a red-violet color with Deniges' resorcinol reagent in sulphuric acid. The quantitative determination was made by means of potassium permanganate, and, after dilution, by means of the reaction of Kalmann—$NaNO_2+2HI=NaI+I+NO+H_2O$. Nitrites were found in the stomachs of the victims in proportions varying from 8.138 to 0.301 gms. of N_2O_3 per kilo. of viscera, but some, at least, of this quantity might have been due to organic putrefaction.—L. Musso, *J. de pharm. et de Chim.*, 1926, 118, 345–360. (Abstract—*The Analyst*, 51:641 (Dec.), 1926.)

Sodium Deficiency in a Corn Ration—Studies have been in progress for three years as to the effect of mineral supplements to a basal ration of corn, casein, and cod liver oil on production of succeeding generations of animals. A calcium salt was always added to the ration. One salt as calcium chloride alone did not permit growth in the first generation but calcium chloride and sodium bicarbonate favored growth in the second generation. Compositions of the various diets are given in which corn is present in 80 per cent or more. Figures on the sodium carbonate added indicate clearly that the beneficial effects are due to the sodium ion. Sodium carbonate and sodium sulfate were used but other sodium salts are not regarded as excluded. This work confirms observations of Mitchell and Carman (*J. Biol. Chem.*, 68:165, 1926), who found that the sodium deficiency of corn is more pronounced than the chlorine deficiency. The corn ration in these experiments supplied sufficient chlorine for growth, gestation, and lactation.—Harry G. Miller, *J. Biol. Chem.*, 70, 3:759 (Nov.), 1926.

Some Lessons of War-Time Undernutrition—The World War afforded an opportunity for the observance of the results of restricted diet among many noncombatants. In a recent address before the New York Academy of Medicine, Professor Friedrich von Müller of Munich reviewed a number of instances of dietary insufficiencies in Europe. Restrictions in the use of meats caused a disappearance of gout and some developed cases showed improvement. With the general population the amount of uric acid in urine and blood fell to half the normal level but no lower, which has led to the observation that on restricted diets essentially purine free, the body can build up complex nucleoproteins but is unable to destroy uric acid. A lower basal metabolism as a result of prolonged undernutrition was manifest in the civilian population of central Europe, which seems to afford an answer to those who champion drastic food reduction as a universal measure. As a result of enforced undernutrition there is a reduction of body temperature, pulse rate and blood pressure with a dimunition of mental and physical efficiency and resistance to diseases. Müller does not rate the hunger edema following bad harvests as an avitaminosis, nor the diminution of fertility a characteristic sign of it. Anemia was not present, nor was chlorosis common in severe cases of hunger edema. It seems to warrant the conclusion that even at the time of serious food shortage synthesis of hemoglobin is easily facilitated. This ability of the organism to synthesize essential constituents is compared to the indispensability of exogenous sources of vitamins and inorganic nutrients.—*Jour. A. M. A.*, 87:2165 (Dec.), 1926.

The Dissolution of Insulin—Funk reports insulin produced in the State Institute of Hygiene in Warsaw was fractionated into two crystalline substances, designated as A and B. A present in large proportion was found to decrease the blood sugar 70 to 80 per cent in normal rabbits. In those with high initial blood sugar this was decreased 10 to 44 per cent. In rabbits with low initial blood sugar no effect or increases from 5 to 20 per cent. B represents a new hormone of complictaed action not easily understood. When injected or given by mouth causes marked increase in blood sugar producing hyperglycemia and glycosuria in rabbits with six doses of 0.2 mg. each per day. This substance causes dilution of blood and enormous retention of water. Since the substance B is found in insulin and the latter hormone in a number of organs, probably in food, and since it acts per os, it is suspected that this substance may have something to do with causing certain forms of diabetes.—*Lancet*, 211:5387, 1140 (Nov. 27), 1926.

CHILD HYGIENE

MERRILL E. CHAMPION, M.D.

Relations Between Mortality in Infancy and in the Subsequent Years of Life—Dr. Falk (Chicago) in his very comprehensive and scientific summary on "Some Statistical Relations between Mortality in Infancy and in the Subsequent Years of Life" notes that the saving of infant lives "is gradually proportional to the sum of money available to the public and private infant welfare agencies," and remarks on the fact that efforts to control infant mortality have not gone uncriticised among those who feel that such work has its drawbacks.

It is common knowledge that in the United States infant death rates from diarrhea and enteritis have been reduced from some 40 to 50 deaths per 1,000 infants to approximately 20 deaths per 1,000 infants in the past 25 years (1900–1925). The death rate figures from malnutrition, premature birth, and congenital debility and injuries, however, have in reality increased from "less than 40 to approximately 45." Dr. Falk states that "changes in nosography have probably counterbalanced true reductions in congenital mortality," and that this increase is now considered to be the result of improvements in accuracy of diagnosis and reporting of causes of death.

The mortality statistics of white infants and children to 9 years of age born and living in Chicago from 1900 to 1925 inclusive, furnished the material for this purely statistical study.

Rates of mortality in infancy from diarrhea and enteritis, congenital debility and premature birth, and all other causes, were tabulated and correlations between infant mortality from these causes, and mortality from all causes in subsequent years are dealt with in great detail.

The conclusions are that so far as the effects of infant welfare are measurable by this study, there was discovered "no evidence of dysgenic consequences," also that it was demonstrated that "mortality has generally been high in the subsequent years of childhood among children who survived the year of infancy in a period in which infant mortality was high and *vice versa*" and credits Farr with the probable explanation for this, that is, the fact that infant welfare operates not only to save life, directly, but also by preventing damaging morbidity.

Finally, "the discovery of a significant positive correlation between mortality from congenital causes and the general mortality of the entire population appears to emphasize the rôle of environmental factors in determining the incidence of congenital debilities and malformations."—I. S. Falk, *J. Prev. Med.*, Nov., 1926.

The Epidemiology of Scarlatinal Throat Infections Sine Exanthemate—Stevens and Dochez have been studying cases of throat infection in which the streptococcus scarlatinae was found. These infections were not accompanied by a rash. This study raised certain questions, as for example:

Could the same strain of streptococcus scarlatinae cause typical scarlet fever in one person and a bacterial throat infection without a rash in another? Could scarlatinal antitoxin benefit a scarlatinal sore throat without eruption? Their conclusions are as follows:

1. The same strain of streptococcus scarlatinae may cause clinical scarlet fever or scarlatina sine exanthemate.
2. Cases of scarlatinal angina are infectious.
3. Scarlatinal antitoxin is an efficient therapeutic agent in scarlatinal throat infections without a rash.
4. Throat infections with streptococcus scarlatinae may occur in persons who have previously had scarlet fever.—Franklin A. Stevens and A. R. Dochez, *Jour. A. M. A.*, Dec. 25, 1926.

Poor Appetite in Children—That much discussed bugbear, refusal of the child to eat, is discussed by Dr. Aldrich and an excellent preventive method outlined which he tested out with a group of 199 children. Dr. Aldrich attacked the problem from the following angles:

Mothers and nurses were instructed while their babies were very young, under 3 months, never to urge their children to eat except under the physician's orders, and to report refusal to eat, just as they would vomiting or diarrhea.

The first refusal to eat was met by a marked reduction in diet, and here was emphasized the fact well known to pediatrists that anorexia is usually the first symptom of acute or chronic illness. "It precedes all other symptoms of the common cold by at least one or two days"; also "Change of attendant and the arrival of a new baby in the household of an hitherto only child are illustrations of psychic causes." If at these times food is forced the bad habit is well planted, as too great an impression is made on the child under such circumstances. Again, weaning is often a time when refusal to eat begins and the mother, feeling the food must be forced, starts trouble. To avoid this, all babies are given an occasional bottle that they may learn to like it. Cod liver oil and orange juice were given from the first weeks of life so the babies were accustomed to the taste and made no objections; and sudden marked changes in the diet were avoided, all changes being gradual. Vegetables were mixed with the accustomed cereal at first for example.

Overfeeding was strictly avoided, and this proved difficult at times as most parents desire above all else for their children marked gain in weight. All these babies were put upon the minimum diet that would cause a satisfactory gain in weight.

After one year no prescribing of definite amounts of food was done—"mothers were told to give their children food not calories."

Mothers were told to leave their children alone at meal time and the children were also taught to feed themselves early.

Avoidance of pitched battles over meals was a point always insisted upon as of utmost importance. The child was allowed a reasonable choice of food; when there were two foods at hand the child was allowed the one he liked the better.

Finally, mothers were requested to read standard books on child psychology early in the game (*i.e.*, by the time the child was a year old at the latest). H. C. Cameron's *The Nervous Child* was usually suggested as a good book to begin.

Dr. Aldrich particularly, and very justly, deplores the popular tendency to blame and even ridicule parents for these eating troubles and remarks in closing, "We must first reach unanimity of purpose ourselves, then broadcast it in no uncertain terms, before we can expect these perplexed, striving and devoted parents to act properly."—C. A. Aldrich, *Ment. Hyg.*, Oct., 1926.

Prevention of Measles by Immune Goat Serum—Various experiments have been tried by Tunnicliff and Hoyne with a serum obtained from a goat convalescing from a reaction produced by the inoculation of a green-producing diplococcus thought to be the cause of measles. The present report gives the results of using such serum in a case of 105 persons with a negative history of measles but with a definite history of exposure to the disease. They give a summary of their results in the following words:

1. Goats have been immunized with green-producing measles diplococci and their filtrates, and an antibacterial and antitoxic serum was produced.

2. From 4 to 6 c.c. of immune goat serum was given to children 1 year old or older and to a few nurses, with a negative history of measles, after a definite exposure to measles. All persons who did not receive serum, and all who received serum five days or more after exposure, developed measles. Goat serum prevented measles in 45 per cent of persons who received serum on the fourth day after contact with measles patients, and in 97 per cent of those who received it within the first three days after exposure.

3. All infants under 1 year of age who received serum after the fourth day after exposure developed measles. Ninety-eight per cent of infants given serum within the first four days after exposure failed to show any signs of the disease.

4. Reactions to the goat serum were observed in 12 per cent of those injected.

5. Although the duration of passive immunity with immune goat serum, as with human convalescent measles serum, is only a few weeks, the serum appears to be useful in preventing measles in very young and sick children, and in stopping epidemics in institutions where the inconvenience of an epidemic is great and the mortality may be high.—Ruth Tunnicliff and A. L. Hoyne, *Jour. A. M. A.*, Dec. 25, 1926.

Present Status of Whooping Cough—A great deal of thoughtful study has been put in recent years to the subject of diagnosis and prevention as well as treatment of whooping cough. The work carried on in Denmark by Thorvald Madsen and others at the Serum Institute of Copenhagen is too little known in this country. The Danish group has employed the cultural method for diagnosis with considerable success. In addition to the cultural method the blood examination has been of use in helping to diagnose whooping cough. In this disease we find a total white cell count increasing with a marked preponderance of lymphocytes. The X-ray is also being used and shows a thickening of the peri-bronchial

tissues and enlargement of the hilus lymph nodes.

Smith in the article here described discusses the work being carried on at the Boston Floating Hospital, giving the results in the treatment of various groups of active cases. Certain of these cases received vaccines alone; others received X-ray treatment alone; others the two in combination; and finally there was a group which received only the ordinary medical treatment and served as controls.

So far as results are concerned it was found that the child receiving combined vaccine and X-ray treatment did the best, although those who received the X-ray treatment alone showed an improvement which Smith refers to as almost phenomenal.

It should be noted that the X-ray treatment is given with such care and with such minimum doses that it is considered that there is no possible danger of bad after-effects to the glandular structures of the area involved.

In summing up his article Smith makes the statement that at the present time we are still a long way off from our ultimate goal in controlling whooping cough. On the other hand he believes that real progress has been made in the early diagnosis of whooping cough and that a prophylactic treatment of exposed cases has become an accomplished fact. His belief is that in time the mortality from this disease will become a negligible one.—Lawrence W. Smith, *Pub. Health Nurse*, Nov., 1926.

Diet in Pregnancy—Dr. Friedman emphasizes the importance of observation of weight as an essential in prenatal care, and proceeds to demonstrate its usefulness from the point of prevention of sepsis.

As 61 per cent of the maternal deaths from sepsis in Massachusetts in 1922-23 followed operation, anything that does away with the necessity of surgical interference seems a decided step in the right direction.

Two factors especially contribute to the number of operative deliveries, first, "a prolonged labor with consequent fatigue so characteristic of the woman in labor who is not making progress"; the second is "mere size of the baby."

In Dr. Friedman's group of prenatal patients weight was watched as all other prenatal conditions were watched. After observation the patient, if the weight was normal, was asked to eat moderately (no "second helpings") but not to skip any meals as it was found that skipping meals was always attended by a rapid gain in weight.

If the mother gained less than one-half pound in a week she was encouraged to eat more but if she gained more she was given a typed copy of diet restrictions to be observed and asked to report weekly to have her weight checked up. Patients who were markedly overweight in early pregnancy were strictly dieted. Dieted patients were more comfortable, had less gas, hyperacidity, etc.

The most striking and unexpected result was the definite shortening of the first stage of labor especially in primiparae with, of course, diminution of number of operative deliveries.

There was a slight but definite decrease in the weight of the baby with less likelihood of birth injuries and less chance of postpartum hemorrhages.—L. V. Friedman, *Boston M. & S. J.*, Nov. 25, 1926.

Tuberculosis in Infants—Dr. Calmette's vaccine prepared from cultures of bovine tubercle bacilli of attenuated virulence gives promise of a protection against tuberculosis in infants. This treatment has already been administered to 2,000 infants in Paris. The immunization against tuberculosis lasts only one year, when it must be repeated, but the culture may be given in milk or bananas which makes it easy to give.

It has been proposed to administer it to older children with the hope of preventing their getting tuberculosis before the fifteenth year as from present statistics about 75 per cent of the adolescent population is found to be infected.—J. A. Smith, Medical Secretary, National Tuberculosis Association, *Americana Annual*, 1926.

Enuresis—Forty children, 4 to 13 years, received treatment at the University of Minnesota Dispensary. The group had careful examination and showed no organic lesions. Infection foci, when found, were removed. All had restricted fluids after 4 P.M., no tea, coffee, or highly seasoned foods at any time. Went to bed at 7:30 and slept on a hard mattress.

Each child was given a hypodermic injection of sterile water, 1 c.c., and told this would cure him. It was emphasized that if a relapse occurred they would have more injections.

The psychic treatment proved successful in 87.5 per cent of the cases. In patients whose urine showed a persistent reversal of concentration, in which the specific gravity of the day specimen was much greater than that of the

night specimen, the treatment failed. In borderline cases, in which the specific gravity of the urine during the day was equal to or slightly greater than that of the night urine, a cure was obtained, but with more difficulty than in cases with normal concentration.—Northwest Pediatric Society Report, *Am. J. Dis. Child.*, Nov., 1926.

Breast **Feeding Problems**—The summary given by Dr. Moore is so much to the point that we give it in full.

1. To overcome the mental hazards of motherhood regarding breast feeding, physicians must stress the fact that every mother who can care for her baby can nurse it.

2. The daily health routine of the lactating mother needs more careful study and regulation by the physician. The amino-acid and vitamin B content of the diet require special attention. Experimentally, a milk diet is very inadequate during this period.

3. Abnormal constitutional conditions including contagious disease in the mother may necessitate artificial feeding for a time, but the glands should be kept active by manual expression, so that breast feeding may be resumed at the earliest possible moment.

4. Open tuberculosis is the only absolute indication for weaning.

5. Premature weaning is at present too frequently the result of remediable conditions in the mammary glands. Breasts and nipples deserve a complete examination, including inspection, palpation and milk expression. Nipple muscle hypertrophy and hypertonicity are curable.

6. Aseptic care of the nipples, together with the routine use of nipple aerators, prevents infections, fissures and mastitis. Aerators evaginate inverted nipples and permit the necessary open-air treatment.

7. The cancer bugaboo as an excuse for avoiding nursing or manual expression is refuted by experience and by statistics.

8. Insufficient milk supply is the most common problem in breast feeding. This problem is best solved by manual expression, the technic of which varies with the type of breast. Proper expression assures success.—C. Ulysses Moore and H. G. Dennis, *Jour. A. M. A.*, Dec. 11, 1926.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN *

"Tell **Us How to Sleep with Open Windows**"—Most readers of the current fresh air propaganda are inarticulate as to their problems, but if they should express themselves doubtless many thousand would plead for practicable, usable, specific information and suggestions. Until the fresh air folks get down to brass tacks progress will be slow.

Here are the "practical suggestions" offered in one nationally circulated periodical:

"Wholesome sleep demands a reduction of whatever may be irritating, including unnecessary abstraction of moisture from the body tissues. (Why not say something about dry air?) To approximate nature's arrangement of temperature, an outdoor sleeping chamber can be arranged. The head of the bed should be placed between open windows (of the "outdoor sleeping chamber"?) avoiding, of course, strong drafts (How?). (Where do we find homes or apartments where a bed can be "placed between open windows"?) Then by reducing materially the heat (how does one induce heat to "reduce"?) in the rest of the room (does one use chalk or barbed wire to indicate "the rest of the room"?) satisfactory conditions may be obtained."

Possibly clarity of expression was impossible because of lack of practicable ideas.

Who will write in newspaper English about open air sleeping?

Who will tell those of us who live in cities *how* we may "approximate nature's arrangement"?

Who will tell us how to keep winter storms outside the open window?

Who will explain how we may be comfortable enough to sleep while avoiding the "unnecessary abstraction of moisture"?

Who will describe how to get an apartment warm in the morning when the janitor does not give us steam until 7 or 8 a.m.?

What national agency will induce a committee of architects to study the problem of open air sleeping?

(More questions in the future.)

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York City.

Participation vs. Forced-feeding—"We would rather have a convention end in failure because of the interest the salesmen have taken and their desire to express themselves, than to have the most successful gathering in which well worded talks by members of the firm or imported spell-binders were delivered to a bunch of salesmen inwardly rebelling at the restraint. . . . Questionnaires sent to the salesmen, suggestions from dealers and the ideas of inside executives are sifted and digested until what is apparently a picture of the next year's program (of sales work) results. This is mailed to each salesman some time in advance with the request that he read it and give the matters touched upon such thought as will enable him intelligently to discuss them."—Getting Salesmen to Come Out of the Audience at Conventions, by C. B. Mathes. *Printers' Ink*, 185 Madison Ave., New York, Oct. 28, 1926. 10 cents.

Coöperative Rural Work—Educational work is tabulated in the annual report of coöperative rural work of the U. S. Public Health Service in *Public Health Reports*, Oct. 22, 1926. The county returns are given under the following heads with the totals for all the counties: Lectures—7,438; Attendance—402,627; Bulletins distributed—448,203; Newspaper articles—5,685; Circular letters—147,626; Health exhibits—562.

The leaders seem to be: Lectures—Harrison, W. Va., 523; Obion, Tenn., 338. Attendance—Jackson, Mo., 39,957; Mason, Ky., 14,426. Bulletins distributed—Jackson, Mo., 67,195. Newspaper articles—Harrison, Miss., 340; San Joaquin district, Calif., 327. Circular letters—Jackson, Mo., 39,957; San Joaquin district, Calif., 17,305. Health exhibits—Mason, Ky., 53; Eddy, N. M., 35.

COÖPERATING GROUPS

"Does your chamber of commerce have a Health Committee?" asks *Health News*, N. Y. State Department of Health, Aug. 16, 1926. "Chambers of Commerce, as well as Rotary, Kiwanis and other service clubs, are able to exert a strong influence in creating and guiding community spirit in civic matters. Since the health of the community is a civic matter of the highest importance these organizations should and many do have health committees which can be of very great assistance to the health officer in furthering progressive policies. According to the July bulletin of the Plattsburg Chamber of Commerce, that organization, at the suggestion of the health officer, is planning active coöperation in the local health clinics and is to have a meeting later in the year devoted exclusively to the topic of public health and welfare."

The Federated Women's Institutes of Canada (organized by provinces and communities): Child Welfare and Public Health Committee, chairman, Dr. Mabel L. Harrington, Health Center, St. John, N. B.; Home Economics Committee, chairman, Mrs. T. Guild, 2174 Argyle St., Regina, Sask. The latter reports much use of health plays.

Group Study for Parents: Practical Suggestions for Parent-Teacher Associations, Women's Clubs and Other Organizations Interested in Child Study. *Children*, 353 Fourth Ave., New York City—14 pages of practical material—with reading lists. 10 cents. One way to interest and to aid local groups is to call attention to helps in their work. This is one worth trying on some of these groups.

Women's Clubs Push Health Work. *Illinois Health News*. Aug., 1926. Outline of seven projects proposed by the Illinois Federation of Women's Clubs.

CAMPAIGNS

"A state-wide campaign to wipe out diphtheria began in Oregon October 1."—Oregon State Board of Health.

Educating the Public—A New Venture. Describes a "Hearty Health for Women" week conducted in Toledo through the coöperative efforts of the Toledo Academy of Medicine, Toledo Public Health Association, and the Ohio State Department of Health.—*Jour. A. M. A.*, Nov. 13, 1926.

MOTION PICTURES

To avoid duplication and to facilitate coöperation in the production of motion pictures tell us of all *proposed* new pictures.

"Some time has been spent in planning educational films on home economics subjects. One on child nutrition has been started, and it is hoped that it and at least one other will be completed during the coming year."—Report of Bureau of Home Economics, U. S. Department of Agriculture. Sept. 1, 1926.

"Since 1920, copies of our (American Social Hygiene Association) films have been distributed to official and voluntary agencies in 17 countries outside the United States. The inhabitants of Egypt, China—even Iceland—are

receiving the social hygiene message that the films impart. Thirty-four copies are being used in England."

A Clinic on Motion Pictures. *American Journal of Public Health.* June, 1926. Report of a St. Louis session of Education and Publicity Section, A.P.H.A.

Surgical Motion Pictures. *Jour. A. M. A.* Nov. 6, 1926. Limitations in their usefulness, and value of lantern slides.

TRAINING

Institutes for tuberculosis workers, to include sessions on publicity and educational methods, will be held during the winter and spring months in Boston, Philadelphia, Indianapolis, and Portland, Ore. Address National Tuberculosis Association.

AWARDS

For the second time the American Museum of Safety, New York City, has awarded the E. H. Harriman Gold Medal to the Union Pacific System for "the most conspicuous accident prevention work in America." A press release of the Museum, free, gives details.

Dr. Thomas A. Storey, newly located at Leland Stanford University as professor of hygiene and physical education, has received the Luther Halsey Gulick Award for "distinguished service in the cause of physical education."

Making Awards of Certificates Occasions for Fond Remembrance. *Red Cross Courier.* Aug. 2, 1926. Simple awards may double their significance if given the proper setting. Tells how several cities did it.

A Milky Way in Georgia, by Mrs. S. B. Whittier. *Public Health Nurse.* Dec., 1926. Also in *Survey.* Dec. 15, 1926. Second prize winner of Harmon Award Quarterly Contest for "accounts of some experiment and achievement in a field of public health."

DISTRIBUTION

"Dressing up" distribution may be secured by the use of colored or decorative paper for enclosing single copies or groups or bunches of educational or report material. Cut the strips of paper to make two or three folds around the printed matter before enclosing in envelope. Sometimes the printer will have scraps which can be cut to the right length. In many cases volunteers can be secured to do the folding. (If you do not get the idea the editor will mail you a demonstration sample.)

BEST SELLERS

Diet and Health, by Peters, continues to hold a place among the ten non-fiction books as reported from book stores in *Publishers' Weekly.* During November it was forced down to ninth place, with The Story of Philosophy and Why We Behave Like Human Beings ranking first and fifth.

FOLKS WE KNOW

Frances Klein, chief of the Health Education Section, Division of Hygiene, Massachusetts State Department of Health, is now studying art in Paris.

Dr. H. E. Kleinschmidt has left the Ohio Department of Health to be medical director of the National Tuberculosis Association.

Dorothy Siedler is health education secretary, Queensboro Tuberculosis and Health Association, New York City.

Miss M. L. Woughter, so long and favorably known as administrative secretary of the American Heart Association, is now executive secretary of the New York State Nurses' Association, 370 Seventh Ave., New York.

AWARD OF MERIT

For annual report with both table of contents and index (the latter with some 700 references):

Philippine Health Service.

EXHIBITS AND EXPOSITIONS

What did you learn about display methods at the Sesqui-Centennial? Please write the editor.

What exhibits at the Sesqui-Centennial especially attracted your attention, and why? Please tell the editor.

A health boat for the rivers and canals of Siam is reported by the International Health Board (1925 Annual Report). "It is 52 feet long and has its own motive power and an electric light plant. It is equipped with a dispensary, a cinema machine, and educational exhibits. It tows a housebarge in which the staff will live . . . Evening lectures will be given in temples on the river banks, (hookworm) treatments will be administered, and an impetus given to latrine construction."

An International Child Welfare Exposition will be held in connection with Fifth Pan-American Child Congress, Havana, Cuba, in February.

A picture of an exposition exhibit in the 1926 report of the Royal New Zealand Society for

the Health of Women and Children shows a conglomerate of charts, diagrams, photographs, models, etc., all too common in all English-speaking countries.

The Dental Hygiene Exhibit of the Massachusetts Department of Public Health. *Journal of the American Dental Association*, Chicago. Aug., 1926. 35 cents. Description and 2 illustrations. Another account of the same in *The Commonhealth*, Massachusetts Department of Public Health, April-June, 1926. Too detailed for reproduction here. Better ask for a copy.

"The First Hygiene Exhibition in the Dutch East Indies is to be held in Bandoeng during June and July, 1927."—*Social Hygiene News.*

Health at the State Fair. *Illinois Health News*, Springfield. Oct., 1926. Free. Thirteen page account with illustrations, of State Department of Public Health exhibit at Illinois State Fair.

Home Economics Open House, by Effie I. Raitt, *Journal of Home Economics*. Feb., 1926. Describes an annual exhibit project. A sand table showing the various disappointing roads and the one safe road to the Land of the Sylph-Like Figure was a feature much enjoyed last year. Casts of mouth and teeth malformed, and one of perfect formation, were effective.

Telling the World About Nursing, by Elise Van Ness. *American Journal of Nursing*. Oct., 1926. Description and two illustrations of nursing exhibit at Sesqui-Centennial Exposition, the last work of Stella Boothe. With picture of Stella Boothe.

PUBLIC HEALTH NURSING

MIRIAM AMES, R.N.

State Directors of Maternity and Infancy Work Convene in Washington—The Third Annual Conference of State Directors of Maternity and Infancy Work was held at the Children's Bureau, Washington, D. C., January 11–14, 1927. The subjects chosen for discussion indicate the trend of thought in this very important branch of public health. They were, "Developing a Permanent Rural Program in Prenatal and Natal Care," "Making Maternity and Infancy Work Permanent," "Administration Problems," and "Maternity and Infancy Nursing Problems."

The Official Grading Committee Program—Dr. May Ayres Burgess, Director of Study of the Committee on the Grading of Nursing Schools, would keep us abreast of the times. In her article which was recently prepared for the *American Journal of Nursing*, we learn that the official grading program has been decided upon, and will continue for a period of 5 years. The plan will embrace wide research and publicity, and a wise provision is made for having each year represent a complete unit of work, in case, for some reason or other, the program has to be curtailed.

The Grading Plan

The program is divided into three projects. Each project is carried through the whole 5-year period, but with emphasis shifting from one to the other. The first and second years concentrate on Project 1, a study of Supply and Demand of nursing service (which involves the problem of the nursing shortage), and will end with a monograph report. The third and fourth years will follow up on Project 1 but concentrate on Project 2, a Job Analysis of nursing and nurse teaching (a study, that is, of how nurses should be prepared for nursing service), and end with a monograph report on Project 2. Project 3, the actual grading of nursing schools, is to receive steady attention throughout the first 4 years, but will become the chief activity of the fifth year, and will, in its turn, result in a monograph report.

This latter is no easy task. Much will depend on the investigator and upon the person who makes the interpretation to the investigator.

Just what will develop from the study is difficult to predict. The laity hopes to find a way to make adequate skilled nursing care available for persons of moderate incomes. The physician and the hospital both are anxious to supply plenty of the best qualified nurses for attendance on their cases. The nurse is looking toward a time when she will have a job that

will satisfy her energy, capability and ambition, and which will present satisfactory conditions for employment.

All nursing schools in the country will be given an opportunity to be included in the grading plan, and, "It is planned that every year at the completion of that year's grading, a comparative study will be made, not of how the individual schools stand, but of how each of the forty-eight states stand in nursing education."

Dr. Burgess has briefly summarized the purpose of the committee in the following words:

The work of the committee will be successful if it can find out the facts as to nursing service; if it can stimulate improved conditions in nursing schools, and in the utilization of nursing service; and if it can lead toward a better understanding between the varied groups involved. As to the first step in its policy, the committee has unanimously voted to put into print at once the full program of the Grading Committee, in the form in which it was finally adopted at the meeting on November 18. While the committee realizes that almost inevitably it will be necessary to make changes in the program as the work progresses, it believes that the public is entitled to know at the start just what the committee now has in mind. If important changes in policy are adopted, they will be publicly announced. In the meanwhile, however, the present program is to be made public. The pamphlet containing the full program can probably be secured from the Grading Committee, at cost, about the middle of January.

Dr. **Winslow's Survey**—Dr. C.-E. A. Winslow last summer directed what was probably the first survey of a community from the point of view of public health nursing, when he studied the Community Health Association, the organization doing the visiting nursing work in Boston. He was assisted by Katharine Tucker, Director of the Philadelphia Visiting Nurse Society, and by Ira V. Hiscock, Assistant Professor of Public Health at the Yale School of Medicine. Dr. Winslow has called the recently published report "The Community Health Association and Its Relation to Boston's Health Program."

In his introductory paragraph he says:

The report presented herewith deals with one specific and definite problem—the program and policies of the Community Health Association. We have been invited to study this program as it has developed to the present day, to consider its soundness and to make recommendations in regard to the lines along which the destinies of the association may best be guided in the future. Since, however, the health program of the entire community in all its aspects forms after all a single problem, it is impossible to consider the program of the Community Health Association intelligently without constant reference to the other agencies, official and voluntary, which are working in the field of public health.

Section I deals with the general health situation in the city, outlining the work of the three other city-wide agencies doing public health nursing in the home, the service of dispensaries and hospitals, and the function of a few voluntary health agencies. Section II defines the Community Health Asociation, its background, and present organization and program. Section III concerns itself with the place of the Association in Boston's health program.

Dr. Winslow introduces the fourth and last section, that on "Suggestions and Recommendations," with the following paragraph:

While our primary commission comes only from the Community Health Association, and our specific recommendations may properly relate only to that organization, the work of all health agencies is necessarily closely correlated and the success of the Community Health program must inevitably depend largely upon what other agencies are doing in related fields. In view of this fact, and in view also of the keen interest taken in the survey by the other official and voluntary health organizations with which we have come in contact, we have been encouraged to preface our specific recommendations to the Community Health Association by certain tentative suggestions in regard to major steps which might be taken by the other health agencies of the city along lines intimately related to the problems of the association itself.

Suggestions follow to the Boston Health League, the city health department, the department of school hygiene, and regarding the tuberculosis program. In conclusion, Dr. Winslow makes specific recommendations concerning the Community Health Association and its general problem of relationship.—*The Community Health Association and Its Relation to Boston's Health Program*, Oct. 1, 1926.

Réne Théophile H. Laennec—Sojourners in Brittany are informed that the renowned Dr. Laennec was born in the plain granite house at No. 2 de la rue du Quai, Quimper. The year 1926 was commemorated as the centenary of his death.

Dr. Réne Théophile H. Laennec gave to the world the rational system of diagnosis of disease of the heart and lungs by adding the art of auscultation to the method of percussion discovered by Auenbrugger. The discovery of the stethoscope was due to Dr. Laennec's interest in the diseases of the chest. The first instrument is pictured in the *Nation's Health*.

It was nothing more than a hollow wooden stick which in 1818 was considered quite remarkable, but is a far cry from the glorified instrument which we see to-day in the physician's hands.—*Nation's Health*, Dec. 15, 1926.

Cancer—Visiting nurses of Massachusetts are being asked to coöperate with the State Department of Health in a new type of cancer study. A questionnaire has been prepared, attacking the cause of cancer from a variety of angles. There are questions touching on heredity, diet, physical build, housing, economic status, race, use of alcohol, tobacco, association with cancer patients, etc.

The nurse is requested to fill out one of these questionnaires for each cancer case that she carries, and another for a patient of the same age, sex, and as far as possible, economic status, who shall thus act as a control.

A second section of the questionnaire deals with the cancer patient's illness only.

Experiences of the Nurse-Midwife in the Kentucky Mountains—"Half the road is in the creek and half the creek is in the road." So one of the natives described the roads of Leslie County, Kentucky.

Leslie County covers an area of 376 square miles of mountainous country with not one made road. It has a population of 10,000 hardy, independent American people and only one doctor. The people live in cabins—one or two rooms and a lean-to kitchen. These cabins are perched along the banks of the creeks.

A voluntary organization of which the State Commission of Health is an honorary member, has organized a generalized nursing service in which midwifery plays an important part. The nurses doing this work are American public health nurses who have been trained in midwifery in England.

The nurses give a complete maternity service. They also visit the sick in their homes, give bedside care, conduct health classes for parents as well as children, and give typhoid and diphtheria antitoxin.

". . . the high-water mark was recently reached when one nurse single-handed in one afternoon gave 140 inoculations against typhoid and diphtheria, while a great triumph, one which we feel deserves national recognition, is recorded for 'Charley Woods' school on Bull Creek where 100 per cent of the children have been inoculated against both diphtheria and typhoid."

The authors of this article are too modest and the picture they draw is almost devoid of the hardships these women have endured and endure cheerfully that this unique piece of work may be accomplished. The absence of railroads and the all but impassable roads mean that life is primitive. The nurses live in a temporary house the roof and walls of which are not weatherproof. The floor is a single layer of boards with cracks that gap, so the pigs can be seen running about under the house which is set up a little above ground. Such foods as fresh milk, butter, eggs, bacon, and fresh meats are rare seasonal delicacies. The natives raise and dry or can their foods. This limits variety very much. The natives do not have cash in hand, but pay for service in kind. From this store of kind, the nurses buy their foods, mostly pork and beans.—Freda Caffin and Caroline Caffin, *Nation's Health*, Dec., 1926.

LAW AND LEGISLATION

JAMES A. TOBEY, LL.B.

MATERIAL on law and legislation as applied to public health seems to be unusually copious these days. It does not, however, emanate from the boreal halls of Congress, where about the only health legislation which has been receiving consideration is the proposed extension of the Federal Maternity and Infancy Act, unless intoxicating liquor can be placed under the category of national vitality.

The President's Message—The annual message of President Coolidge, read to Congress on December 7, is a disappointment as far as public health is concerned, for it contains no direct mention of this vital subject. There are two or three references to such matters as the eradication of tuberculosis from cattle, medical education for the negro, and the physical welfare of the wage earner, but not a

thing on the state of the nation's health or methods for its improvement. Mr. Coolidge is the first president since Cleveland who has not said something about national health in his messages. He has several more to deliver, however, and he may yet consider correlation of federal health activities or some similar subject of importance to national vitality.

The **Maternity and Infancy Act**—The bill (H.R. 7555) for extension of the Federal Maternity and Infancy Act has come up in the Senate on several occasions, but the usual methods have been employed. It was passed over on December 10, but on the following day, Senator Sheppard had placed in the *Congressional Record* a reply by Miss Abbott to a violent and scurrilous attack on the measure, the Children's Bureau, and various individuals, by the board of directors of the Woman Patriot Publishing Company, formerly maintaining an anti-suffrage organ and now probable able to maintain its existence only by making unreasonable onslaughts on the Children's Bureau. Without doubt, the petition prepared by this Woman Patriot cabal is the most asinine document which has yet appeared on the subject of maternity and infancy, in spite of which Senator Bayard of Delaware had it printed in the *Record* last July. It is full of references to the bolsheviki, who are alleged to be back of this whole business, with the Children's Bureau as their professed agents. Miss Abbott's reply, which is decent and dignified, points to innumerable misstatements in the ravings of the female patriots. Even an opponent of the maternity and infancy scheme could not help but be disgusted by this extravaganza.

On January 13, the Senate passed the bill, with an amendment requiring that the work definitely come to an end on June 30, 1929. The bill, therefore, goes to conference as the House had passed it with no such restriction.

In transmitting the national budget for the fiscal year 1928 to Congress, the President does not include an estimate for carrying on the work under the so-called Sheppard-Towner Act. He states that a bill for the extension of this maternity and infancy program, which comes to an end on June 30, 1927, is now pending and that if it becomes a law he will submit a supplementary estimate. In discussing this matter, he says, "I am in favor of the proposed legislation extending the period of operation of this law with the understanding and hope that the administration of the funds to be provided would be with a view to the gradual withdrawal of the federal government from the field, leaving to the states, who have been paid by federal funds and schooled under federal supervision, the privilege and duty of maintaining this important work without aid or interference from the federal government."

Mr. Blanton Objects — Representative Blanton of Texas was in his usual objectionable mood the other day, when he objected, under the unanimous consent rule, to passage of the bill (H.R. 12468) for paying for human blood for transfusions, and also registered his objection to S. 2729 to appropriate $25,000 for the Columbia Hospital for Women and Lying-In Asylum, and H.R. 10355 for the construction of a nurses' home for this institution. Mr. Blanton's consistent attitude exemplifies his qualifications for membership on the board of directors of the above mentioned Woman Patriot concern.

Other Bills in Congress—A private corporation to manufacture, store, and dispense medicinal liquor is proposed in H.R. 15601, introduced by Mr. Green of Iowa and said to have the support of Secretary of the Treasury Mellon. The bill is a long and detailed one and should be read by anyone directly interested. Senator Hawes has proposed an amendment to the National Prohibition Act (S. 4915) to permit the use of alcoholic liquors for medicinal purposes. Meanwhile, the Treasury Department is searching for an unpalatable, but non-poisonous adulterant for industrial alcohol, so that those law-abiding citizens who would insist upon drinking this stuff will be dissuaded therefrom without recourse to a hearse.

A national institute of health is proposed by H.R. 15477, introduced by Representative Kindred, physician and lawyer. This is similar to the bill (S. 4540) entered by Senator Ransdell last July.

Employes of the Veterans' Bureau who were formerly commissioned in the Public Health Service would be reimbursed for travel subsequent to June 7, 1924, by the terms of S. 4755. The Director of the Budget has actually approved this measure, which involves some $5,000 for paying travel expenses of physicians.

International Narcotic Control—The Department of State has sent instructions to American ambassadors and ministers relative to this government's attitude on the control of

narcotics. The United States looks with disfavor on the narcotic conventions held by the League of Nations in 1924 and 1925, but is an adherent of the Hague treaty of 1912. Article 6 of chapter 2 of this convention provides that the signatory powers will endeavor to suppress the production of opium, but apparently nothing at all has been done about it. The United States desires to have this section enforced, as smuggled opium constitutes the chief problem here. It is pointed out that our legislation prohibits the importation of certain narcotics except for medicinal purposes and only then by permit, and this is cited as an example of an effective law.

Praise and Condemnation for St. Elizabeths—Two interesting reports have recently appeared on conditions at St. Elizabeths, the Government Hospital for the Insane. A special committee of five eminent physicians appointed by the Secretary of the Interior believes that St. Elizabeths is not excelled by any hospital in many respects pertaining to the care and treatment of mental disorders. The committee finds, however, that the institution is overcrowded and poorly equipped, and that the laws regarding admission and discharge are in many cases defective.

The other report comes from the Controller General. He also condemns the laws as inadequate and indefinite and states that numerous patients are now illegally confined. Overcrowding is prevalent, he finds, and the fire hazard great. Patients likewise do not have proper opportunities to obtain assistance, legal and otherwise.

It is a strange thing that the most prosperous government in the world cannot take adequate care of its 3,900 or so insane wards.

Health Law Enforcement in Chicago—The excellent 835-page report of the Chicago Health Department for the years 1923, 1924 and 1925 contains 10 pages on law enforcement. This city has a system whereby preliminary hearings on violations of sanitary and food ordinances are held before the bureau chief concerned and a clerk; then if necessary a final hearing before a board consisting of the commissioner, an assistant commissioner, and the bureau chief involved. If this procedure does not solve the matter, court action is instituted. The law division handles these cases at all stages. In 1925 there were 16,362 cases, of which 1,720 were given the final hearing. In addition, 700 cases on Sunday closing of meat stores were heard. Of the total, only 142 ended up in court in 1925, as compared with 946 out of 16,945 total cases in 1924. Just as the best type of attorney is one who keeps his clients out of court to their advantage, so too the most efficient health department has the minimum number of court actions.

Several court decisions relating to Chicago's health are reported. The Supreme Court upheld an ordinance regulating laundries, in Moy vs. Chicago, 309 Ill. 243, and Don vs. Chicago, 314 Ill. 201, but did not sustain an ordinance to license factories and workshops, as the legislature had granted no such power. The Appellate Court upheld the right of the health commissioner to exercise his discretion in refusing to grant a license for a birth control clinic, in the case of State ex rel. Carpenter vs. Dever, 236 Ill. App. 135. During the three years 32 writs of habeas corpus were brought against the commissioner, to secure the release of venereally infected women, but in every case the courts denied the writ.

A résumé of various ordinances adopted is given and a statistical summary of hearings and suits is appended. Incidentally, this entire report is valuable as a reference on practical public health administration.

Improper Revocation of Milk License—The New York City Health Department was restrained by injunction from revoking a license of a local dairyman in an opinion rendered by the Supreme Court in Brooklyn on December 24, 1926. The court held that the Health Commissioner had taken his action because the dairy in question had been offering free milk and cash bonuses to dairies, a scheme which he thought would lead to adulteration. The court held that this was unwarranted oppression and not true protection of the public health. There being no question about the quality of the milk, the commissioner had exceeded his authority. Since this court is one of general jurisdiction, an appeal can be taken. In the opinion of the associate editor, the position of the trial judge is correct and would be upheld.

Tuberculin Test Upheld—In a masterful decision the Supreme Court of Iowa recently sustained the right of the state to provide for the eradication of bovine tuberculosis. Fevold vs. Board of Supervisors of Webster County, 210 N. W. 139. This decision, which is an able presentation of the scope of the police

power, is also reported in the *New York Law Journal* for December 1, 1926. Many authorities are cited, the ground covered being similar to the chapter on police power in the book, *Public Health Law*.

Anthrax as Compensable Accident—According to the *Monthly Labor Review* for December, 1926, anthrax contracted in the course of employment is a compensable accident under the workmen's compensation law of Texas. Houston Packing Co. vs. Mason, 286 S. W. 862. The Civil Court of Appeals made an extensive review of the decisions, some conflicting, and decided that not only the weight of authority but the sounder principles pointed to the result reached by it.

Rights of State Health Department—An individual who violated an order of the State Board of Health of Vermont which prohibited boating on a pond serving as a source of a city water supply was convicted and fined. On appeal the State Supreme Court upheld these proceedings and sustained the order as an entirely proper exercise of the police power. State vs. Quattropani, 133 Atl. 352. An important phrase in the decision was: "This court does not see any reason for departing from a policy fully established by its decisions of approving a generously free exercise of the power to safeguard the health of the public." This is a good decision and one which ought to be of special interest to state health officers.

Health Court Decisions Compiled—Court decisions pertaining to public health, as abstracted in *Public Health Reports* from 1919 to 1925 have been compiled by William Fowler, LL.B., and issued as *Supplement No. 56* by the United States Public Health Service. The digests are arranged alphabetically by subjects, and a table of cases is given. This is a very useful index and digest of recent public health court decisions, though persons concerned with legal matters should, of course, read the entire decisions. The utility of the compilation would have been enhanced if more complete citations had been given for the cases.

Miscellaneous Items—The Supreme Court of California has refused to enjoin the establishment and maintenance by the City of Pasadena of an isolation hospital in a residential district. Jardine vs. Pasadena, 248 P. 225.

Pamphlets on Children of Illegitimate Birth *(Bureau Publication No. 166)* and Public Aid to Mothers with Dependent Children *(Bureau Publication No. 162)* have been issued by the United States Children's Bureau. Both were prepared by Emma O. Lundberg.

The report of the U. S. Public Health Service for 1926 is now available. The work of the Service is described at much length in *Public Health Reports* for December 10, 1926. This is a compilation of a series of articles which appeared in the *United States Daily*. Some day some one will write something with a real popular appeal about the truly fascinating work of this government bureau.

A libel suit was brought against the *New York American* last October as a result of an alleged exposé of the delinquent practices of a milk company, according to *Editor & Publisher*, passed on to us by Mr. Routzahn.

The Secretary of Agriculture has recommended that the regulatory and research work of the Bureau of Chemistry be separated and combined with similar functions of other bureaus, such as Soils, to form two new bureaus. This is a step in the right direction. This bureau is about to launch a survey of the entire field of pharmaceutical preparations, in order to raise the standard of American drugs.

Hearings on the subject of chiropractic in New York were begun in December by a joint legislative committee.

The progressive *Boston Medical and Surgical Journal* is running every two weeks a department entitled "Notes on National Affairs," which reports on matters of medical interest before Congress, the executive departments, and the United States Supreme Court.

The constitutional amendment in Georgia, allowing counties to levy taxes to pay fees for registrars of vital statistics, is reported to have been adopted by an overwhelming majority.

CONVENTIONS

Feb. 13–20, Pan-American Child Congress, Havana, Cuba.

Feb. 14–17, Council on Medical Education and Hospitals of the American Medical Association, Chicago, Ill.

Feb. 15–16, Federation of State Medical Boards of United States, Chicago, Ill.

Feb. 21–25, American College of Physicians, Cleveland, Ohio.

Feb. 26–March 3, The Department of Superintendence of the National Education Association of the United States, Dallas, Tex.

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The following questions and answers will briefly outline the role that is played by each antidiphtheric measure:

Q. How may one determine whether or not a child is susceptible to diphtheria?

Ans. Application of the simple Schick test informs the doctor whether or not the child will take the disease if exposed.

Q. If the child is not immune, how can the disease be prevented?

Ans. Treatment with Toxin-Antitoxin Mixture. This consists of three injections at weekly intervals and offers slight inconvenience to the child.

Q. A child who has never been treated with Toxin-Antitoxin Mixture, and who may not be immune, becomes exposed to the disease. What course should be followed?

Ans. Prompt treatment with a prophylactic dose of Diphtheria Antitoxin. This gives immediate protection against diphtheria, but the protection lasts for a few weeks only.

Q. What is necessary to save the life of a child who has diphtheria?

Ans. Early use of diphtheria antitoxin. The physician has means by which he can definitely recognize diphtheria, in which case he immediately institutes antitoxin treatment.

Your doctor is familiar with the standard represented by:

Diphtheria Antitoxin (refined and concentrated) P. D. & Co.

Diphtheria Toxin for the Schick Test, P. D. & Co.

Diphtheria Toxin-Antitoxin Mixture (Diphtheria Prophylactic) P. D. & Co.

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